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ELECTRON DENSITIES and SCALE HEIGHTS in the TOPSIDE IONOSPHERE: ALOUETTE I OBSERVATIONS OVER THE AMERICAN CONTINENTS

Volume IV

CHAN, COLIN, and THOMAS

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ELECTRON DENSITIES and SCALE HEIGHTS in the TOPSIDE IONOSPHERE: Alouette I Observations Over the American Continents

Volume IV

Summary Graphs

Kwok-Long Chan, Lawrence Colin, and John O. Thomas

Ames Research Center
Moffett Field, California

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Symbols and Abbreviations

N	electron density, per cm^3
H	scale height, km
LT	local time, hours and minutes
UT	universal time, hours and minutes
Longitude	geographic longitude, deg; positive sign indicates longitude east of Greenwich; negative sign, west of Greenwich
Latitude	geographic latitude, deg; positive sign indicates northern latitude; negative sign, southern latitude
Dip latitude	magnetic latitude, deg; positive sign indicates northern latitude; negative sign, southern latitude
Pass number	pass number of Alouette I satellite
K_p	geomagnetic planetary 3-hour-range index
$^a_{4,5,6\ldots9,0}$	electron density at 400, 500,...1000 km
◇	scale height at 500 km
⊙	scale height at 700 km for individual pass and at 900 km for average value
⊡	scale height at 900 km for individual pass and at 700 km for average value

[a]The number in heavier print at the top of the averaged electron density data indicates the number of data points at 700 kilometers used for computing each average.

Symbols and Abbreviations
and
Indexes to Figures

References

1. Thomas, J. O.; Rycroft, M. J.; and Colin, L.: Electron Densities and Scale Heights in the Topside Ionosphere: Alouette I Observations in Midlatitudes. NASA SP-3026, 1966.
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7. Thomas, J. O.; Rycroft, M. J.; Covert, Margaret; Briggs, B. R.; and Colin, L.: Ionosphere Topside Sounder Studies—II: The Calculation of the Electron Density and the Magnetic Field Parameters at the Alouette I Orbit. NASA TN D-2921, 1965.
8. Jensen, D. C.; and Cain, J. C.: An Interim Geomagnetic Field. J. Geophys. Res., vol. 67, no. 9, Aug. 1962, p. 3568.

properly reduced from the topside ionograms. The ionospheric cross sections presented in this volume are taken primarily from those data exhibiting large latitudinal coverage over the American continents. Several satellite passes with relatively small latitudinal coverage contained in the three preceding volumes have been deleted in this volume.

The variations of N(h) and H(h) versus dip latitude along the satellite orbit are presented in figures 2 to 152, with the index of graphs listed in table I. The local time, geographic latitude and longitude of the satellite are also indicated (information on dip latitude and local time was not given in volumes I, II, and III). The electron density data points from 400 to 1000 kilometers at 100-kilometer intervals are represented by the numbers 4, 5, . . . 0, respectively, on a logarithmic scale. The scale-height data points at 500, 700, and 900 kilometers are represented by symbols of diamonds, circles, and squares, respectively, on the graph. The actual values of the data points are located at the center of each number or symbol.

The graphs were plotted automatically at 1° increments of dip latitude; that is, data points at 23.00° and 23.99° will both appear at 23° dip latitude. Hence, overlapping of data points occasionally occurs. This overlapping is most frequent at high latitudes where the latitudinal variation of the satellite's position with time is relatively small. The pass number of the satellite advances by one whenever the satellite makes a south-to-north equatorial crossing. Therefore, for a south-to-north satellite pass, two pass numbers are listed on the graph; whereas there is only one pass number for a north-to-south satellite pass. The universal times, in hours and minutes, for the first and the last profiles, are indicated; and the geomagnetic planetary indices (K_p) for each 3-hour range during the period of satellite observation are also given.

Latitudinal variations of the seasonal average.—All the tabulated data in volumes I, II, and III (refs. 2 to 4) were separated into seasons and then divided into 5° dip latitude ranges (from -60° to 90° dip latitude) and 1-hour local time intervals (from 0000 to 2400 LT). The data within the -30° to -150° longitude range were then averaged. The available seasons for averaging are northern winter and southern summer for November and December 1962 and January 1963; northern summer and southern winter for May, June, and July 1963, and equinoxes for March and September 1963.

The latitudinal variations of N(h) and H(h) data at 1-hour local-time intervals for different seasons are presented in figures 153 to 219, with the index for these graphs listed in table II. The format of the seasonal average graphs is similar to that of individual satellite pass plots except that the scale height data points at 500, 700, and 900 kilometers are represented by symbols of diamonds, squares, and circles, respectively, on the graph. The integer numbers (larger print), on top of each electron density graph, are the total number of data points available at 700 kilometers (and consequently almost the same number of data points available at other altitudes) for the calculation of the plotted average. These numbers are provided to allow the reader to assess for himself the reasonableness of each average.

Diurnal variations of the seasonal average.—The diurnal variations of the N(h) and H(h) data for each 5° dip latitude range for different seasons are presented in figures 220 to 310. An index for these graphs is listed in table III. The format and symbolism on these graphs are identical to those of the latitudinal variations of the seasonal averages. The integer numbers (larger print), shown every 1 hour of local time on top of each electron density graph, are again the total number of data points available at 700 kilometers (and consequently almost the same number of data points available at other altitudes) for the calculation of the plotted average. It is suggested that the diurnal variation graphs should be used with caution. The orbit of the Alouette I satellite is such that a diurnal variation can be obtained only through the analysis of slightly more than 3 months of data from any station. Furthermore, all data within -30° to -150° longitude have been included for the calculation of the average. It is for this reason that the diurnal variations for the equinox seasons are incomplete.

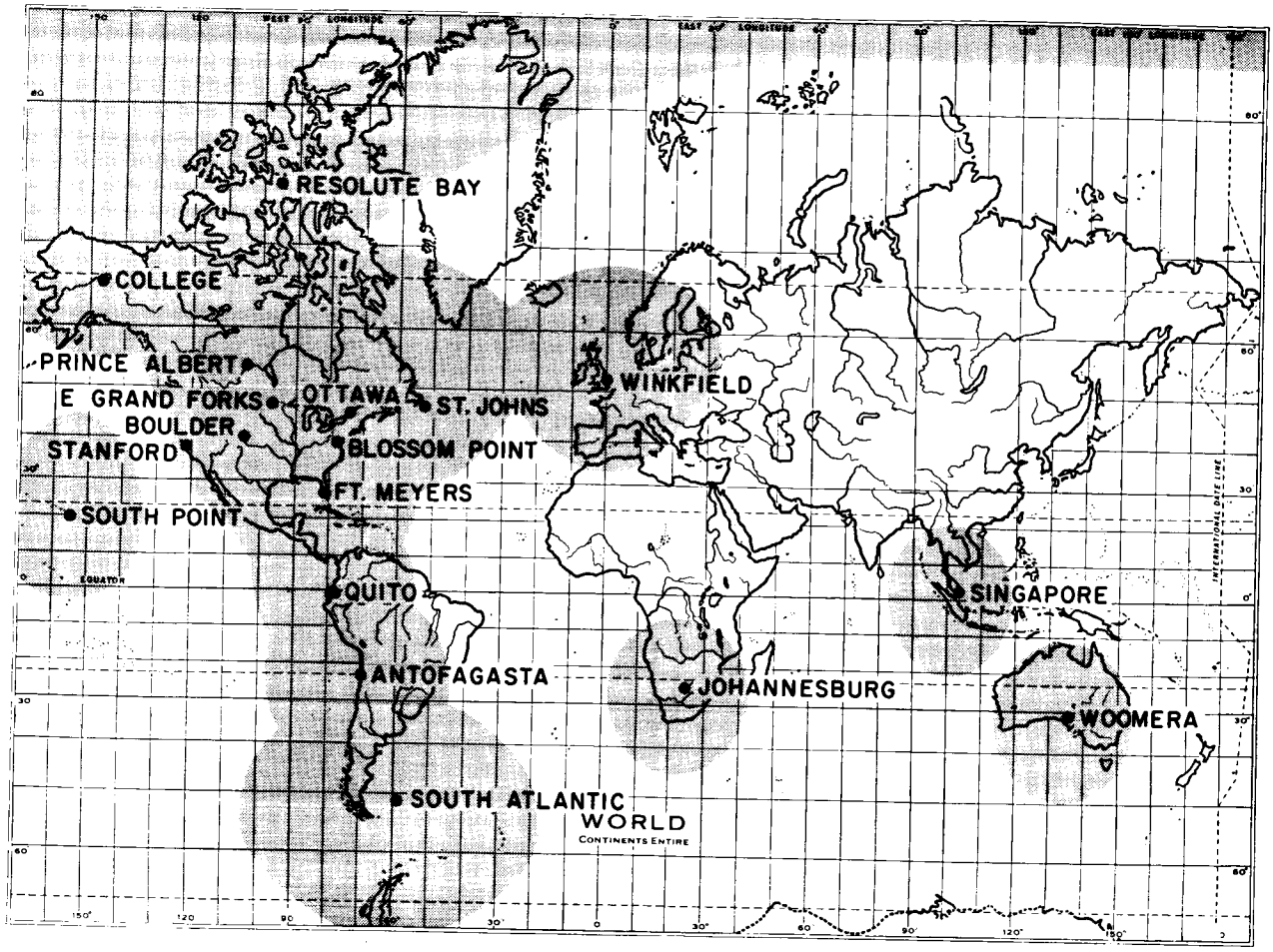


Figure 1.—Location and coverage of Alouette I telemetry receiving station.

were evaluated by means of a spherical harmonic expansion representation of the field using coefficients as computed by Jensen and Cain (ref. 8).

For presentation in this volume the data tabulated in the first three volumes were selected, averaged, and graphs automatically prepared (EAI Dataplotter, Model 3440). The electron density data and the corresponding plasma scale height data were plotted one above the other on the same page to facilitate comparison. These data at several constant altitudes are represented by numbers or symbols on the graphs. The actual values are located at the center of each number or symbol. The graphs are grouped into three main categories: (1) variations of electron density and scale height at fixed altitudes below the individual satellite orbits, (2) latitudinal variations of the seasonal average of electron density and scale height at fixed altitudes for 1-hour local-time increments, and (3) diurnal variations of the seasonal average of electron density and scale height at fixed altitudes for 5° dip latitude increments. No attempt was made to connect or smooth the individual points or the average values.

Variations along the individual satellite orbits.—The Alouette I satellite, when commanded on, probes the underlying inonosphere approximately once in every 18 seconds. A latitudinal cross section of the topside ionosphere can be constructed by combining consecutive N(h) profiles,

Introduction

This is one of a series of NASA Special Publications (refs. 1 to 4) presenting data on electron density (N) and plasma scale height (H) at various heights (h) and times (t) in the topside ionosphere. The data presented were computed and plotted in the Computation and Analysis Branch of Ames Research Center from Alouette I topside sounder ionograms, made available by the World Data Center. The Alouette I satellite is in an almost circular orbit at an altitude of 1000 kilometers with an inclination of 80.5° and an orbital period of 105.4 minutes (ref. 5).

The ionograms selected for analysis and presentation in volumes I to IV were chosen primarily for nearly complete latitudinal coverage over the American continents (i.e., approximately from 80° N to 80° S geographic latitude or from 90° N to 70° S dip latitude near the 80° W meridian) during winter, summer, and equinox months at a sunspot minimum epoch of the solar cycle. The location and coverage of each Alouette I telemetry receiving station is shown in figure 1. Ionogram data recorded at Antofagasta, College, Ft. Meyers, East Grand Forks, Ottawa, Prince Albert, Quito, Resolute Bay, South Atlantic Station, and St. Johns were chosen for analysis.

More than 10,000 ionograms have been analyzed and corresponding electron density and scale height profiles produced. In the first three volumes (refs. 2 to 4) tabulations of N(h,t) and H(h,t) data were published. In this fourth volume of the series, graphs of both electron density and scale height data, summarizing the results of the first three volumes, are presented. Indices to the summary graphs are listed in tables I, II, and III.

The authors wish to acknowledge the outstanding efforts of J. O. Thomas, formerly of Ames Research Center and currently at Imperial College, University of London, in establishing the Alouette I data reduction program at Ames. The authors also wish to acknowledge gratefully the continuing courtesy and cooperation of scientists of the Canadian Defence Research Telecommunications Establishment, Ottawa, Canada, particularly J. H. Chapman, E. S. Warren, and G. L. Nelms. The authors wish also to thank the World Data Center, Boulder, Colorado, particularly Patricia Smith, for providing the Alouette I ionograms. The ionograms were read and digitized by members of the staff of the Stanford Research Institute under the supervision of T. Dayharsh and J. Hice.

Use of Graphs

The electron density and scale height data, presented in the first three volumes, were computed by the method of "overlapping polynomials" (refs. 6 and 7) using digitized h'(f) data, measured along the leading edge of the extraordinary trace on each ionogram. The quantity H is defined as $H = -N/(dN/dh)$. The required satellite position data are obtained by linear interpolation of the corresponding orbital information listed at 1-minute intervals in Alouette Refined World Maps supplied by Goddard Space Flight Center. The required Earth's magnetic field parameters

Table I.—Index for Individual Satellite Passes

DATE	PASS	BEG UT	END UT	BEG LT	END LT	FIGURE
01 NOV 1962	0447	2358	0047	1150	2046	2
01 NOV 1962	0460	2251	2338	1322	2008	3
02 NOV 1962	0474	2342	0005	1729	1839	4
03 NOV 1962	0487	2218	2306	1024	1925	5
04 NOV 1962	0493-0494	0952	1024	0425	0622	6
04 NOV 1962	0501	2258	2343	1305	1922	7
06 NOV 1962	0528	2225	2312	1104	1905	8
07 NOV 1962	0541	2116	2207	0926	2006	9
09 NOV 1962	0569	2237	2321	1452	1910	10
10 NOV 1962	0582	2134	2214	1603	2007	11
11 NOV 1962	0596	2204	2251	1326	1922	12
13 NOV 1962	0623	2130	2219	0913	1845	13
14 NOV 1962	0636	2024	2111	1152	1845	14
15 NOV 1962	0650	2101	2147	1137	1700	15
17 NOV 1962	0677	2031	2119	1140	1859	16
18 NOV 1962	0691	2109	2157	1235	1913	17
24 NOV 1962	0772	1936	2015	1107	1552	18
25 NOV 1962	0786	2012	2102	0926	1831	19
04 DEC 1962	0908	1845	1936	0651	1702	20
07 DEC 1962	0949	1853	1940	0811	1516	21
11 DEC 1962	1003	1803	1840	1211	1456	22
15 DEC 1962	1057	1657	1737	1106	1422	23
20 DEC 1962	1125	1631	1710	1008	1259	24
24 DEC 1962	1179	1524	1613	0522	1408	25
25 DEC 1962	1193	1607	1651	0936	1426	26
30 DEC 1962	1261	1545	1627	0914	1328	27
31 DEC 1962	1274	1429	1519	0440	1345	28
02 JAN 1963	1301	1403	1444	0805	1126	29
06 JAN 1963	1356	1444	1533	0626	1316	30
07 JAN 1963	1369	1339	1424	0746	1242	31
08 JAN 1963	1383	1417	1502	0734	1249	32
09 JAN 1963	1396	1307	1351	0659	1107	33
12 JAN 1963	1437	1338	1356	0849	1023	34
14 JAN 1963	1464	1238	1329	0134	1153	35
15 JAN 1963	1478	1315	1405	0046	1053	36
16 JAN 1963	1491	1212	1257	0552	1054	37
18 JAN 1963	1518	1135	1225	2353	0954	38
20 JAN 1963	1546	1257	1342	0547	1100	39
21 JAN 1963	1559	1204	1233	0718	1022	40
22 JAN 1963	1573	1224	1312	0442	1103	41
23 JAN 1963	1586	1117	1203	0501	1040	42
25 JAN 1963	1614	1231	1307	0431	0738	43
27 JAN 1963	1641	1204	1232	0527	0708	44

Table I.—Index for Individual Satellite Passes - Continued

DATE	PASS	BEG UT	END UT	BEG LT	END LT	FIGURE
28 JAN 1963	1654	1106	1140	0616	1050	45
29 JAN 1963	1668	1131	1217	0439	1002	46
01 MAR 1963	2096	1945	2010	1423	1748	47
02 MAR 1963	2108-2109	1828	1855	1354	1520	48
03 MAR 1963	2122-2123	1903	1941	1339	1930	49
04 MAR 1963	2130	0759	0850	1928	0056	50
04 MAR 1963	2136-2137	1949	2012	1354	1525	51
06 MAR 1963	2156	0606	0633	0141	0422	52
06 MAR 1963	2163-2164	1912	1949	1322	2103	53
07 MAR 1963	2176-2177	1754	1842	1221	2144	54
08 MAR 1963	2184	0658	0739	1944	0029	55
08 MAR 1963	2190-2191	1841	1920	1306	2202	56
09 MAR 1963	2197	0552	0640	2229	0006	57
09 MAR 1963	2203-2204	1733	1759	1302	1425	58
10 MAR 1963	2211	0629	0714	2157	0029	59
10 MAR 1963	2218	1819	1847	1312	2049	60
11 MAR 1963	2231-2232	1853	1916	1257	1428	61
12 MAR 1963	2238	0555	0647	2359	0436	62
13 MAR 1963	2251	0504	0538	0026	0327	63
13 MAR 1963	2258-2259	1821	1855	1239	2048	64
14 MAR 1963	2271	1659	1725	1126	1259	65
15 MAR 1963	2279	0603	0653	1850	0322	66
15 MAR 1963	2285-2286	1745	1814	1209	1349	67
16 MAR 1963	2292	0524	0546	0038	0340	68
16 MAR 1963	2298-2299	1637	1705	1201	1328	69
17 MAR 1963	2312-2313	1713	1752	1149	1952	70
18 MAR 1963	2326-2327	1757	1823	1200	1410	71
20 MAR 1963	2353-2354	1722	1800	1135	2041	72
21 MAR 1963	2366-2367	1604	1651	1031	2034	73
22 MAR 1963	2374	0524	0557	0008	2326	74
22 MAR 1963	2380-2381	1650	1729	1114	2042	75
23 MAR 1963	2393-2394	1542	1609	1107	1233	76
24 MAR 1963	2401	0447	0526	2232	0212	77
24 MAR 1963	2407-2408	1629	1647	1124	1229	78
27 MAR 1963	2448-2449	1627	1705	1038	2002	79
31 MAR 1963	2502-2503	1523	1601	0959	1638	80
02 MAY 1963	2944	2338	0024	1243	1948	81
03 MAY 1963	2950-2951	1125	1158	0558	1444	82
03 MAY 1963	2957	2232	2315	1452	1841	83
04 MAY 1963	2971	2317	2344	1706	1828	84
10 MAY 1963	3052	2137	2213	1420	1747	85
13 MAY 1963	3093	2140	2222	0415	1733	86
16 MAY 1963	3134	2148	2229	1058	1715	87

Table I.—Index for Individual Satellite Passes - Continued

DATE	PASS	BEG UT	END UT	BEG LT	END LT	FIGURE
17 MAY 1963	3147	2042	2121	1308	1704	88
18 MAY 1963	3160	1929	2008	0802	1638	89
18 MAY 1963	3161	2139	2158	1600	1654	90
19 MAY 1963	3174	2007	2047	0817	1635	91
23 MAY 1963	3229	2053	2136	1007	1629	92
24 MAY 1963	3235-3236	0847	0913	0331	1151	93
24 MAY 1963	3242	1947	2024	1226	1601	94
26 MAY 1963	3269	1912	1951	0737	1537	95
27 MAY 1963	3283	1950	2029	0741	1530	96
28 MAY 1963	3296	1856	1920	1415	1520	97
30 MAY 1963	3324	1958	2044	0922	1605	98
31 MAY 1963	3337	1852	1927	1121	1457	99
01 JUNE 1963	3343-3344	0637	0700	0212	0335	100
02 JUNE 1963	3364	1817	1856	0618	1442	101
03 JUNE 1963	3378	1854	1938	0547	1456	102
04 JUNE 1963	3391	1748	1823	0857	1423	103
06 JUNE 1963	3419	1903	1947	0830	1454	104
07 JUNE 1963	3432	1757	1835	1028	1415	105
08 JUNE 1963	3446	1834	1920	1007	1524	106
10 JUNE 1963	3473	1800	1840	0642	1347	107
12 JUNE 1963	3493-3494	0622	0700	0036	1004	108
13 JUNE 1963	3506-3507	0514	0551	0029	0936	109
14 JUNE 1963	3527	1702	1738	0942	1312	110
18 JUNE 1963	3581	1558	1634	0704	1232	111
21 JUNE 1963	3651-3616	0504	0533	2345	0845	112
21 JUNE 1963	3622	1606	1642	0757	1214	113
24 JUNE 1963	3663	1610	1644	0421	1143	114
25 JUNE 1963	3676	1503	1541	0549	1145	115
28 JUNE 1963	3717	1511	1550	0707	1132	116
30 JUNE 1963	3737-3738	0329	0406	2211	0626	117
02 JULY 1963	3771	1419	1446	0921	1046	118
04 JULY 1963	3799	1522	1607	0350	1115	119
05 JULY 1963	3812	1416	1455	0308	1040	120
06 JULY 1963	3818-3819	0203	0216	2142	2215	121
08 JULY 1963	3853	1420	1504	0229	1030	122
09 JULY 1963	3866	1313	1348	0405	0947	123
11 JULY 1963	3894	1443	1503	0838	0929	124
13 JULY 1963	3921	1358	1427	0453	0901	125
15 JULY 1963	3948	1325	1404	0153	0907	126
16 JULY 1963	3961	1217	1254	0204	0855	127
20 JULY 1963	4008-4009	0007	0026	1938	2026	128
20 JULY 1963	4016	1303	1338	0403	0821	129
21 JULY 1963	4022-4023	0046	0122	1935	0438	130

Table I.—Index for Individual Satellite Passes - Concluded

DATE	PASS	BEG UT	END UT	BEG LT	END LT	FIGURE
22 JULY 1963	4043	1230	1249	0053	0720	131
23 JULY 1963	4056	1122	1153	0056	0743	132
24 JULY 1963	4063-4064	0051	0129	2004	0441	133
24 JULY 1963	4076-4077	2340	0021	1849	0407	134
25 JULY 1963	4084	1237	1258	0117	0703	135
26 JULY 1963	4090-4091	0019	0058	1846	0413	136
26 JULY 1963	4103-4104	2302	2331	1745	1932	137
27 JULY 1963	4117-4118	2357	0016	1855	2002	138
29 JULY 1963	4131-4132	0032	0055	1840	0706	139
29 JULY 1963	4138	1145	1201	0547	0643	140
30 JULY 1963	4151	1040	1057	0559	0646	141
31 JULY 1963	4158-4159	0000	0024	0813	1958	142
01 SEPT 1963	4605-4606	1755	1833	1245	1521	143
05 SEPT 1963	4654	0707	0753	0039	0318	144
07 SEPT 1963	4681	0635	0723	1907	0316	145
12 SEPT 1963	4749	0612	0658	1929	0225	146
13 SEPT 1963	4762	0513	0550	2351	0222	147
14 SEPT 1963	4776	0542	0631	2058	0415	148
16 SEPT 1963	4803	0509	0559	1736	0309	149
17 SEPT 1963	4816	0405	0450	2320	0225	150
19 SEPT 1963	4844	0517	0606	1847	0306	151
31 OCT 1963	5427	2240	2328	1837	2144	152

Table II.—Index of the Latitudinal Variations of the Seasonal Average

LT (hr)	Nov., Dec. 1962, and Jan. 1963	March 1963	May, June, and July 1963	September 1963
00	Fig. 153	Fig. 177	Fig. 189	Fig. 213
01	154	178	190	214
02	155	179	191	215
03	156	180	192	216
04	157	---	193	---
05	158	---	194	---
06	159	---	195	---
07	160	---	196	---
08	161	---	197	---
09	162	---	198	---
10	163	181	199	---
11	164	182	200	---
12	165	183	201	---
13	166	184	202	---
14	167	185	203	---
15	168	186	204	217
16	169	---	205	---
17	170	---	206	---
18	171	---	207	---
19	172	---	208	---
20	173	---	209	---
21	174	---	210	---
22	175	187	211	218
23	176	188	212	219

Table III.—Index of the Diurnal Variation of the Seasonal Average

Dip latitude, deg	Nov., Dec. 1962, and Jan. 1963	March 1963	May, June, and July 1963	September 1963
90 to 85	Fig. 220	---	Fig. 276	---
85 to 80	221	Fig. 250	277	Fig. 304
80 to 75	222	251	278	---
75 to 70	223	252	279	---
70 to 65	224	253	280	305
65 to 60	225	254	281	---
60 to 55	226	255	282	---
55 to 50	227	256	283	306
50 to 45	228	257	284	307
45 to 40	229	258	285	---
40 to 35	230	259	286	---
35 to 30	231	260	287	---
30 to 25	232	261	288	---
25 to 20	233	262	289	---
20 to 15	234	263	290	---
15 to 10	235	264	291	---
10 to 5	236	265	292	---
5 to 0	237	266	293	---
0 to -5	238	267	294	---
-5 to -10	239	268	295	---
-10 to -15	240	269	296	---
-15 to -20	241	270	297	---
-20 to -25	242	271	298	---
-25 to -30	243	272	299	---
-30 to -35	244	273	300	308
-35 to -40	245	274	301	309
-40 to -45	246	275	302	310
-45 to -50	247	---	303	---
-50 to -55	248	---	---	---
-55 to -60	249	---	---	---

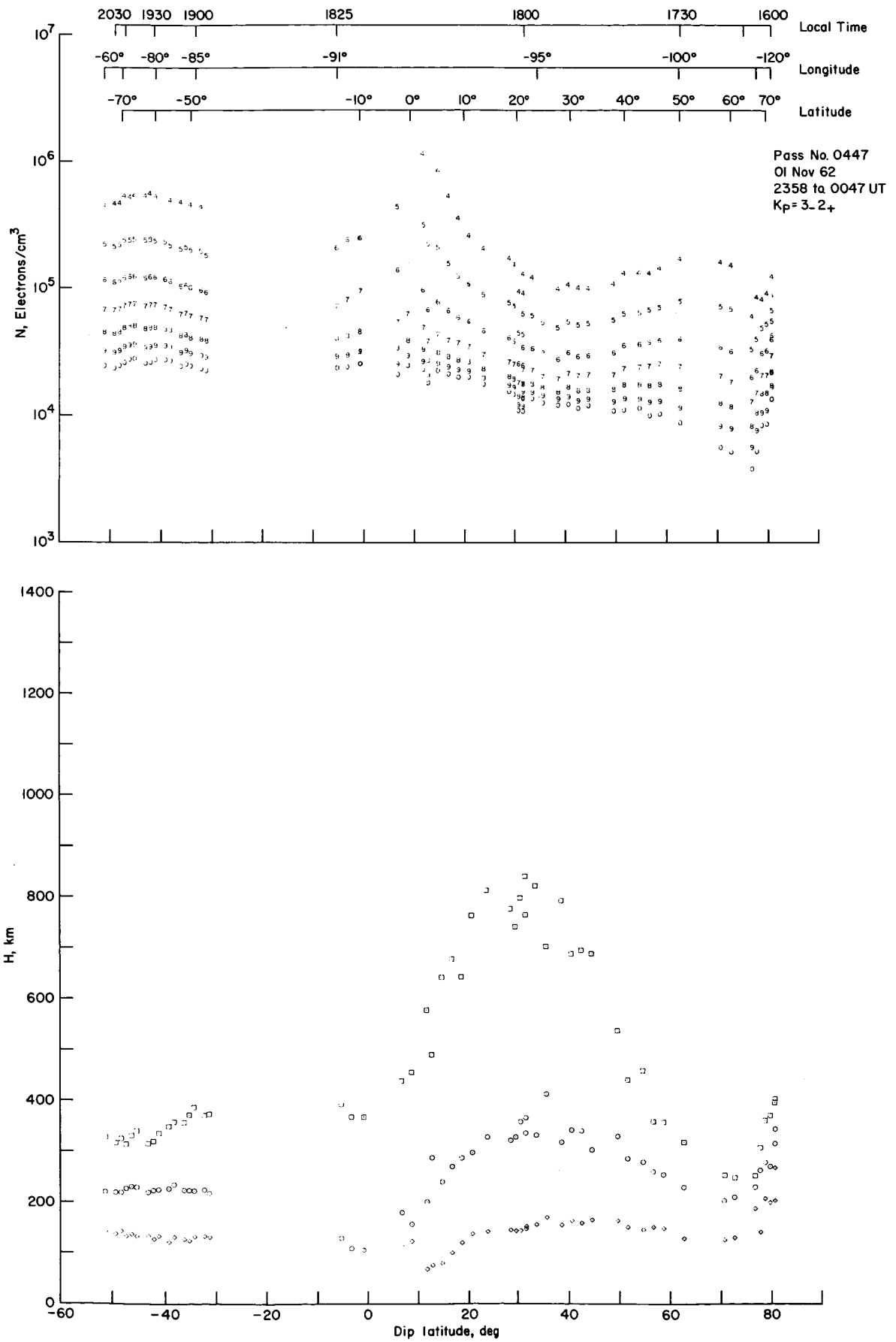

2030 1930 1900 1825 1800 1730 1600
Local Time
-60° -80° -85° -91° -95° -100° -120°
Longitude
-70° -50° -10° 0° 10° 20° 30° 40° 50° 60° 70°
Latitude
Pass No. 0447
01 Nov 62
2358 to 0047 UT
Kp = 3- 2+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 2

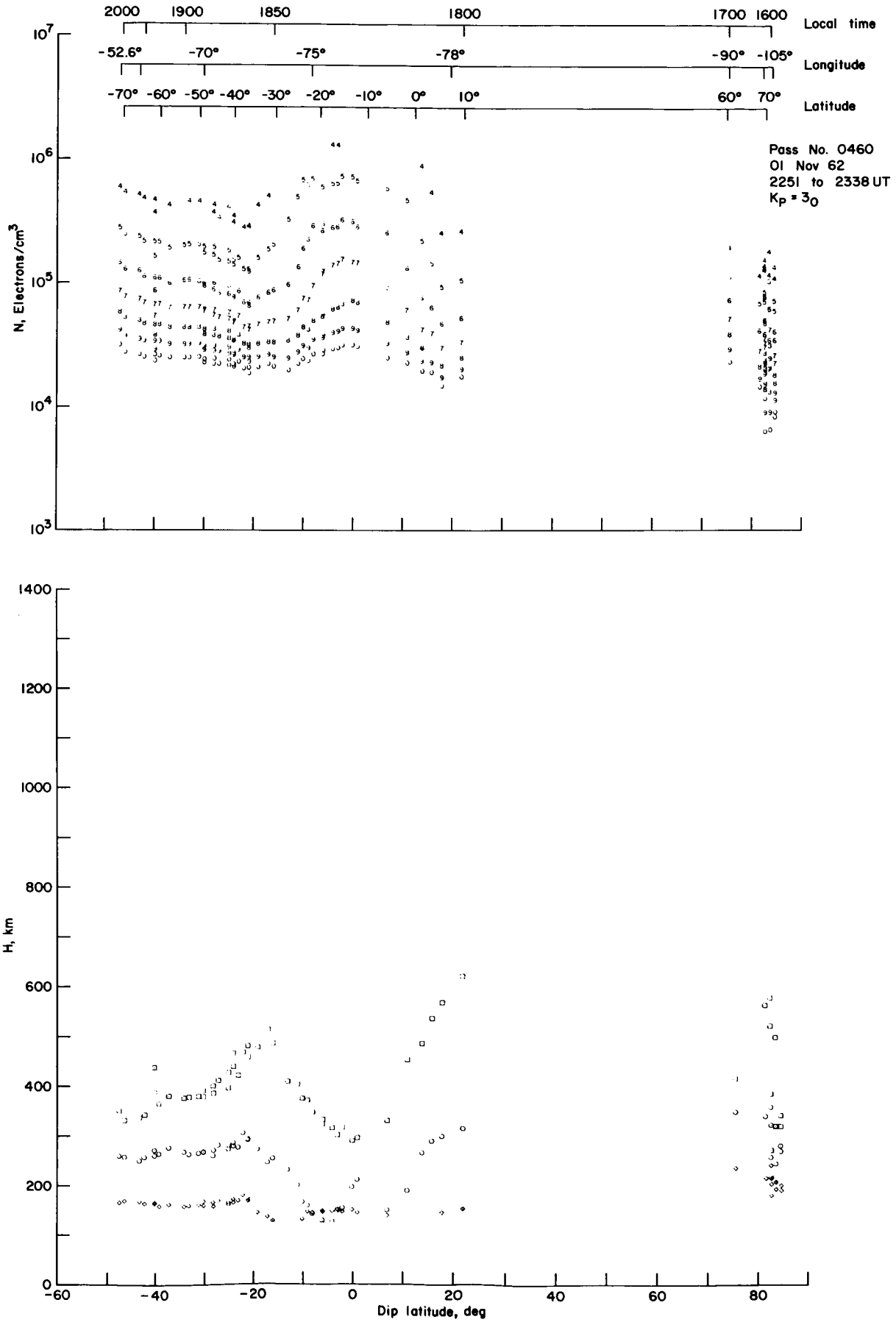

2000 1900 1850 1800 1700 1600
Local time
-52.6° -70° -75° -78° -90° -105°
Longitude
-70° -60° -50° -40° -30° -20° -10° 0° 10° 60° 70°
Latitude
Pass No. 0460
01 Nov 62
2251 to 2338 UT
$K_p = 3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 3

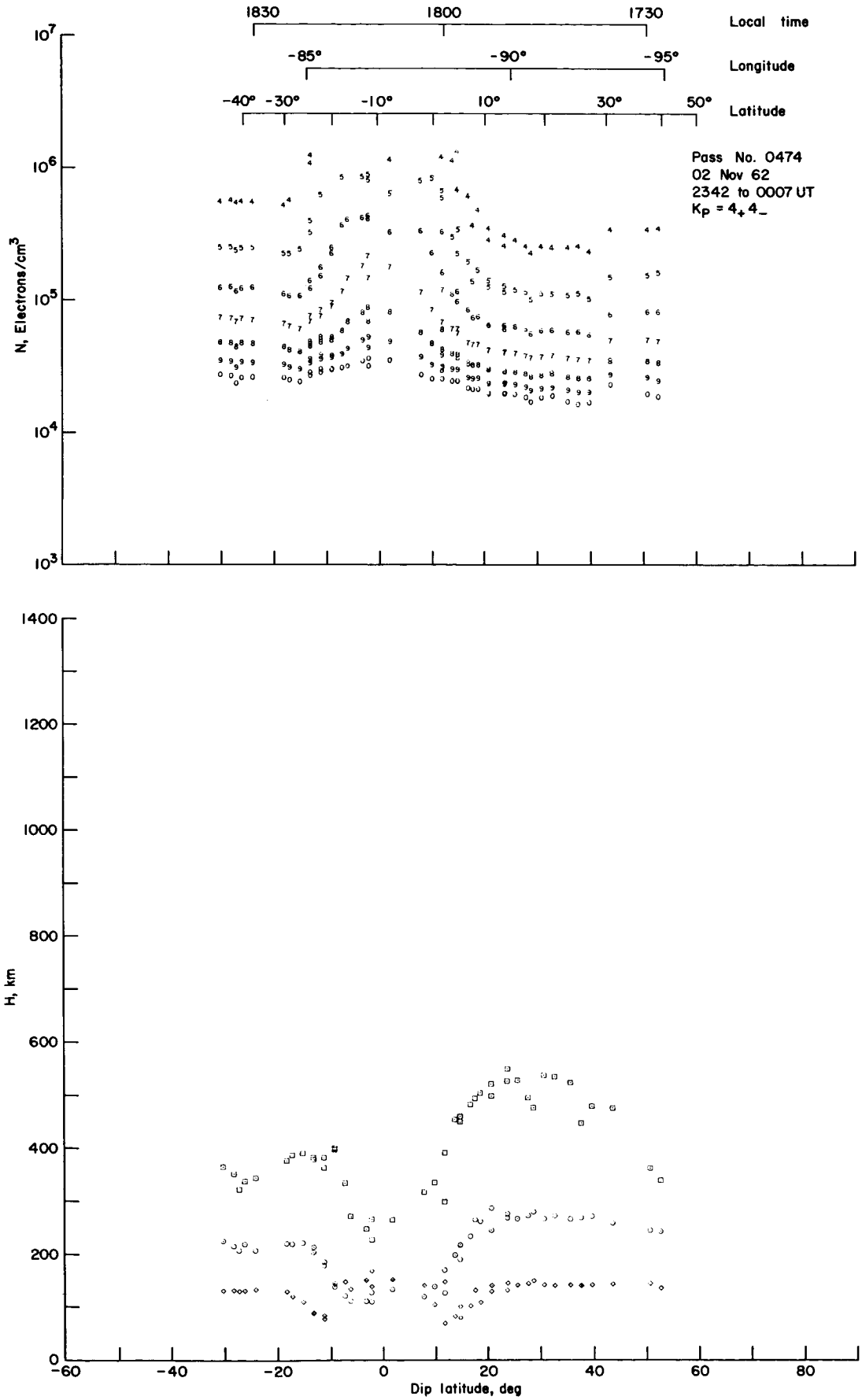
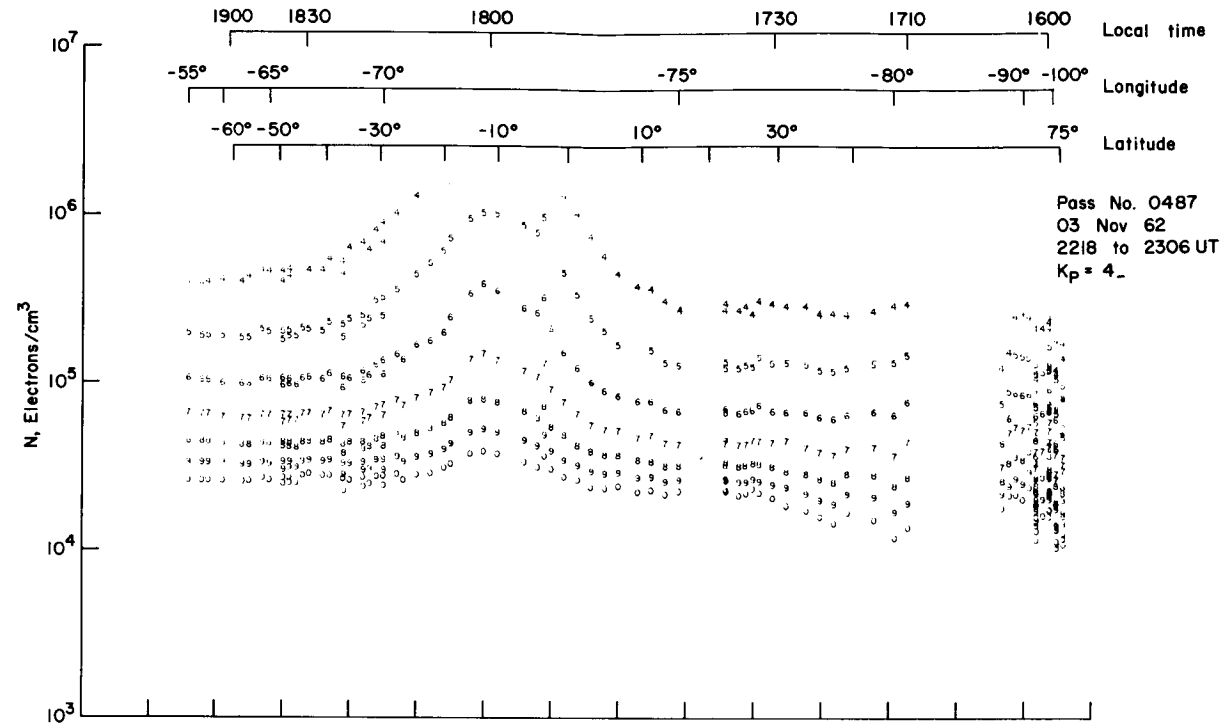

1830
1800
1730
Local time
-85°
-90°
-95°
Longitude
-40°
-30°
-10°
10°
30°
50°
Latitude
Pass No. 0474
02 Nov 62
2342 to 0007 UT
$K_P = 4_+ 4_-$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 4


1900 1830 1800 1730 1710 1600
Local time
-55° -65° -70° -75° -80° -90° -100°
Longitude
-60° -50° -30° -10° 10° 30° 75°
Latitude
Pass No. 0487
03 Nov 62
2218 to 2306 UT
K_P = 4-
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

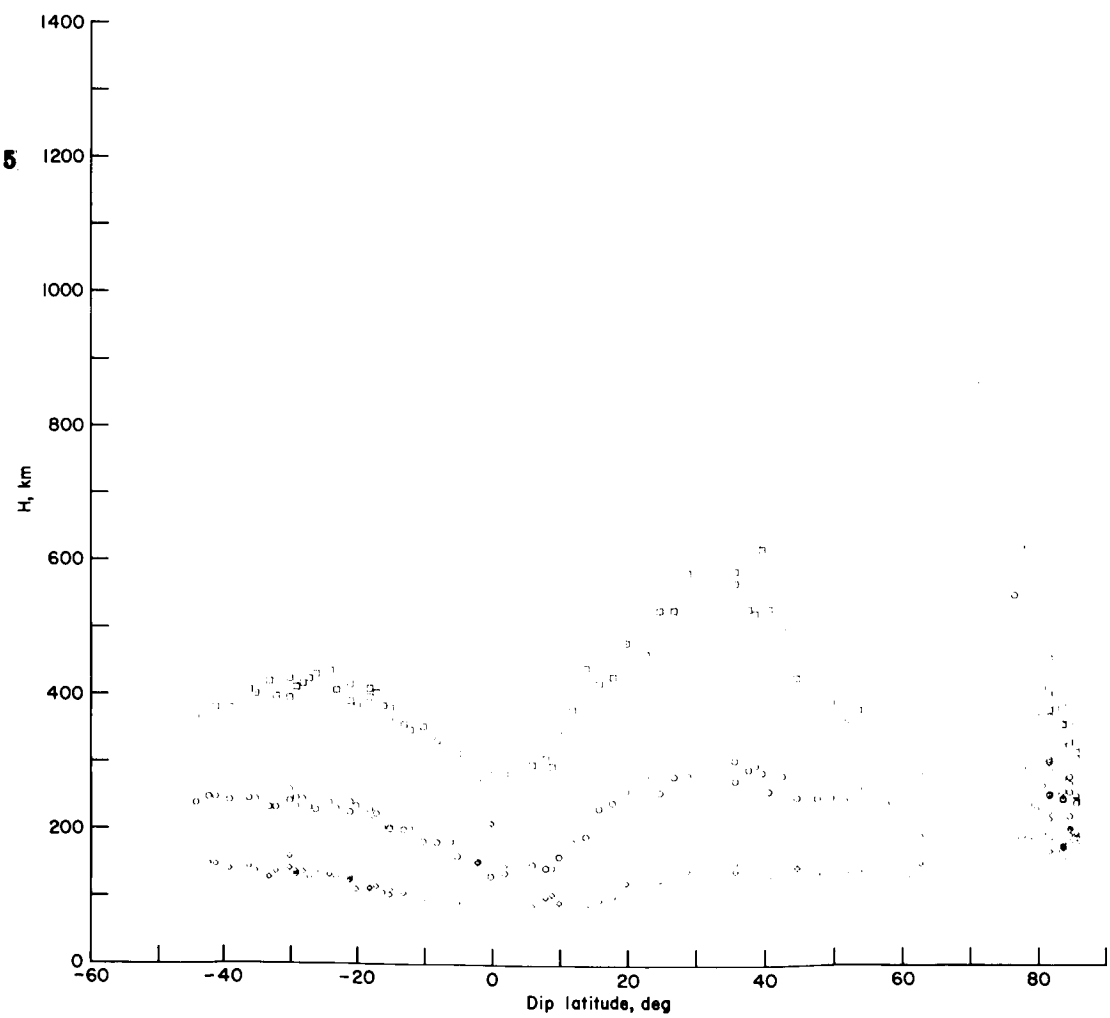
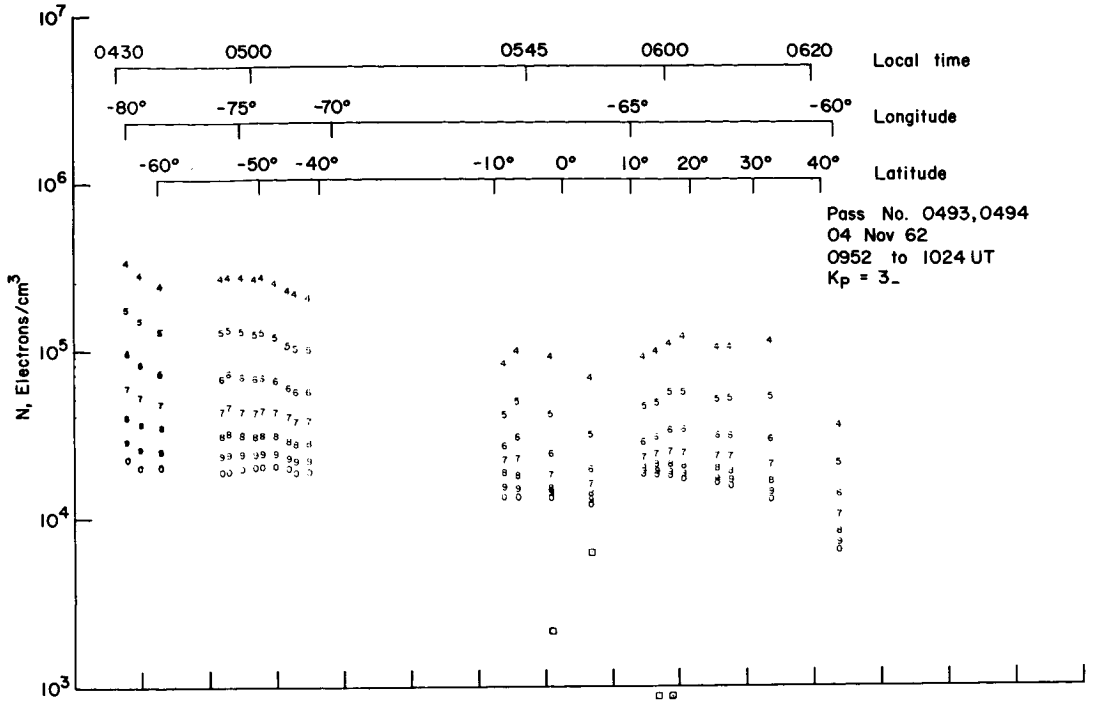

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 5


0430
0500
0545
0600
0620
Local time
-80°
-75°
-70°
-65°
-60°
Longitude
-60°
-50°
-40°
-10°
0°
10°
20°
30°
40°
Latitude
Pass No. 0493,0494
04 Nov 62
0952 to 1024 UT
Kp = 3-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

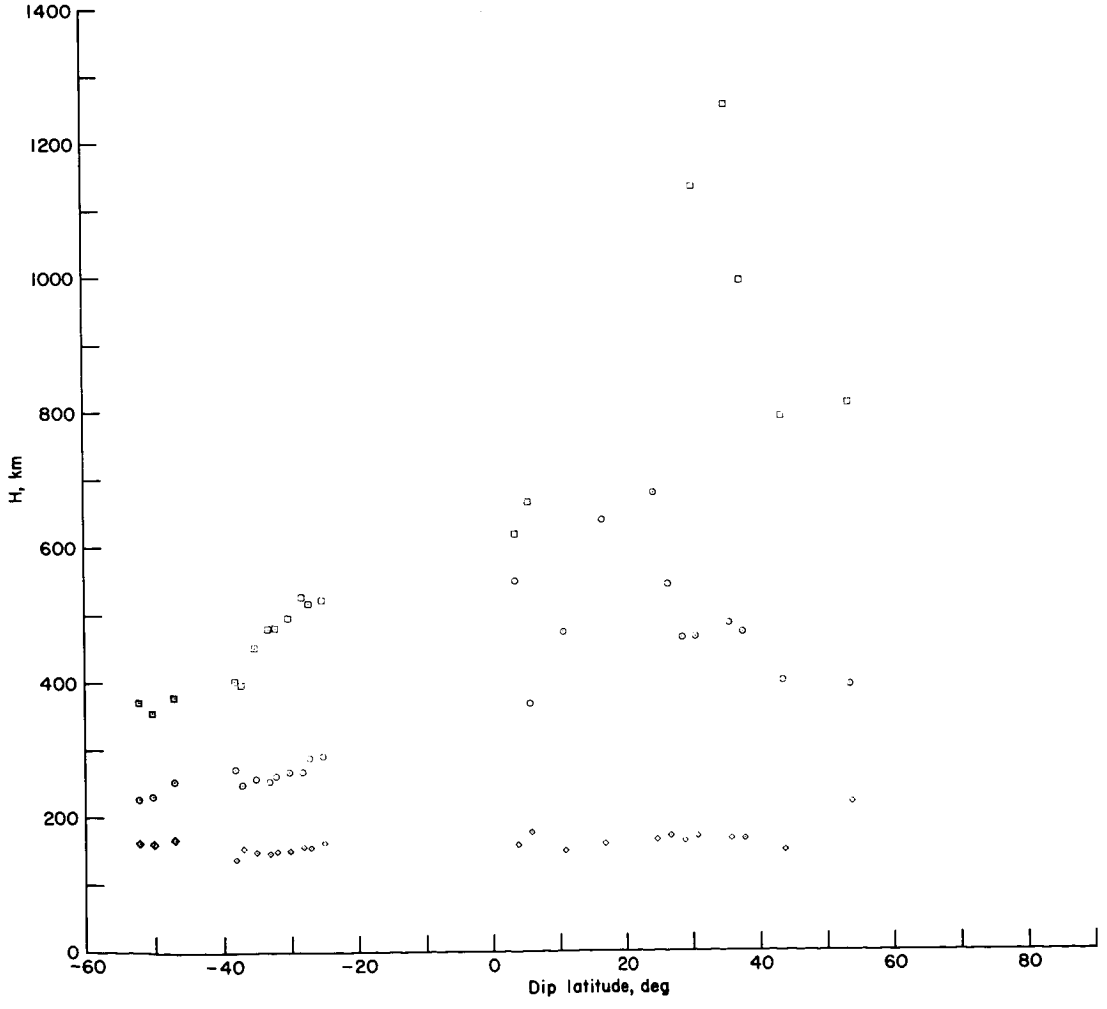
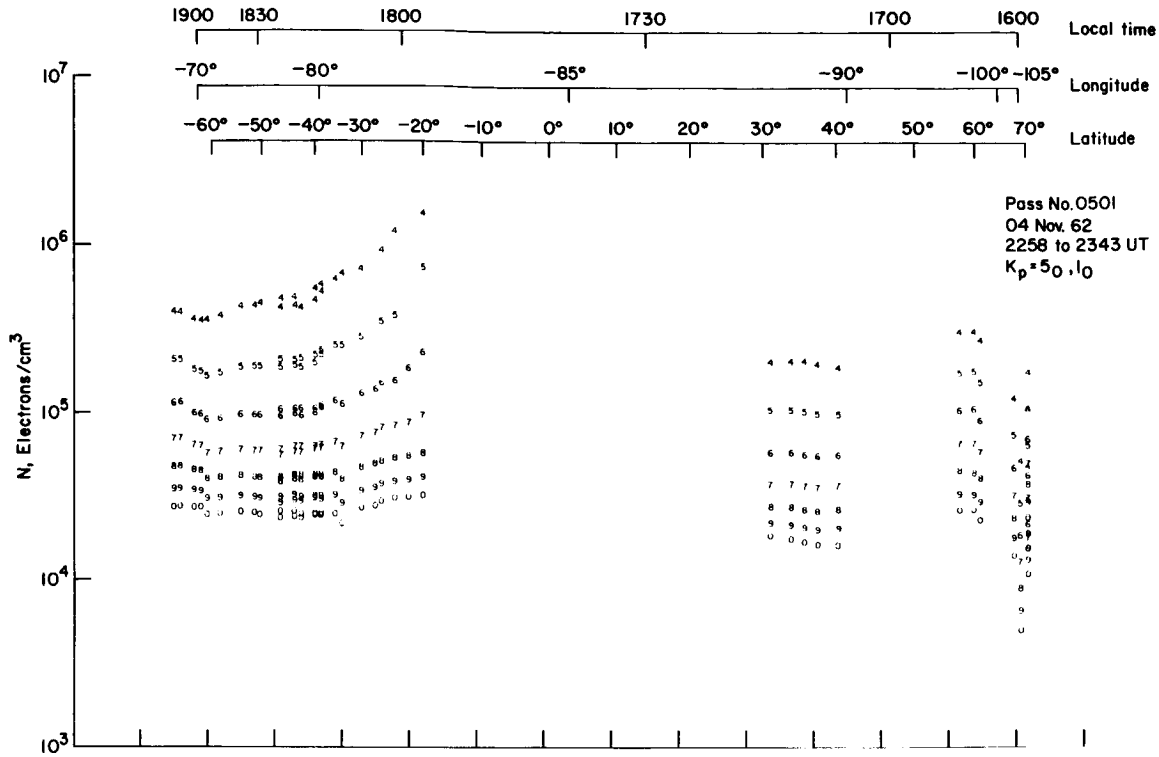

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 6


1900 1830 1800 1730 1700 1600
Local time
−70° −80° −85° −90° −100° −105°
Longitude
−60° −50° −40° −30° −20° −10° 0° 10° 20° 30° 40° 50° 60° 70°
Latitude
Pass No. 0501
04 Nov. 62
2258 to 2343 UT
$K_p = 5_0, 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

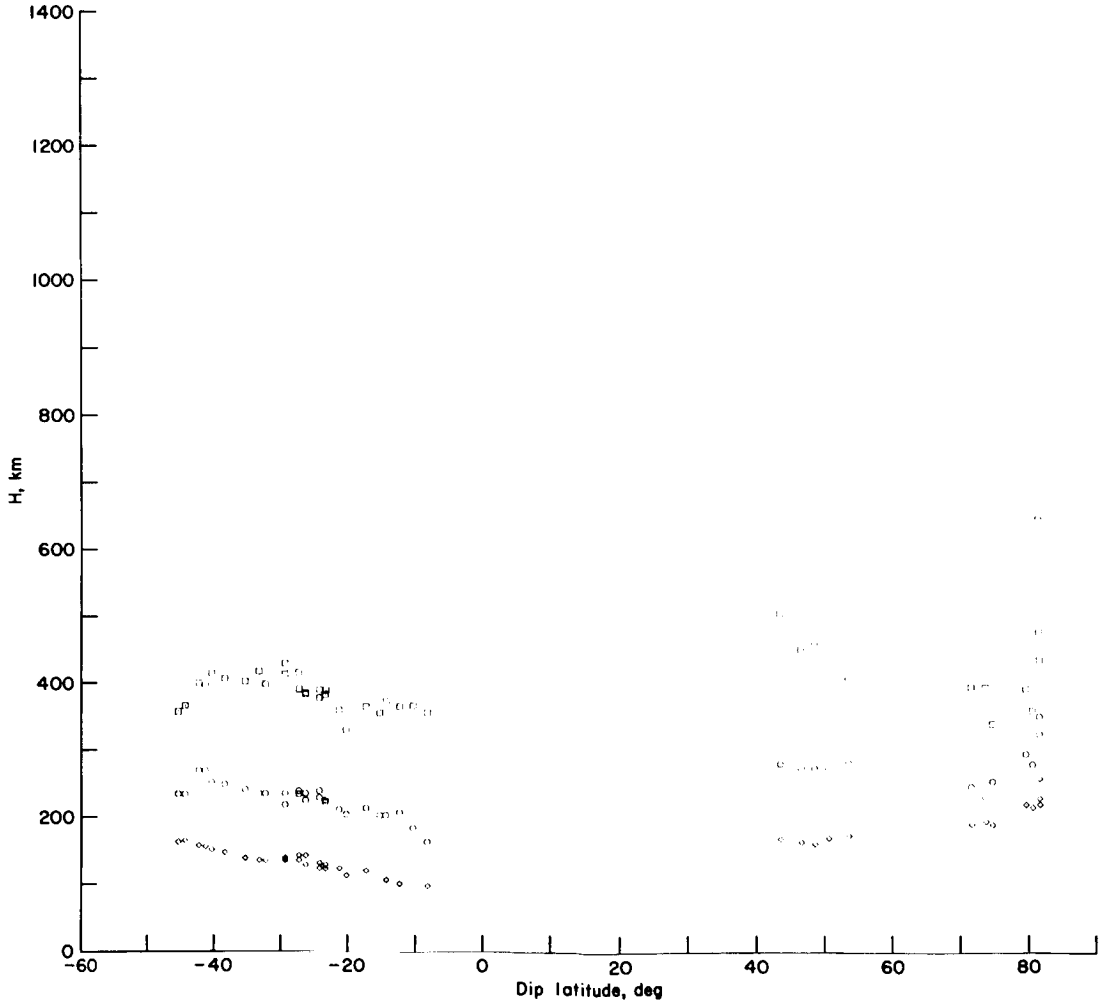
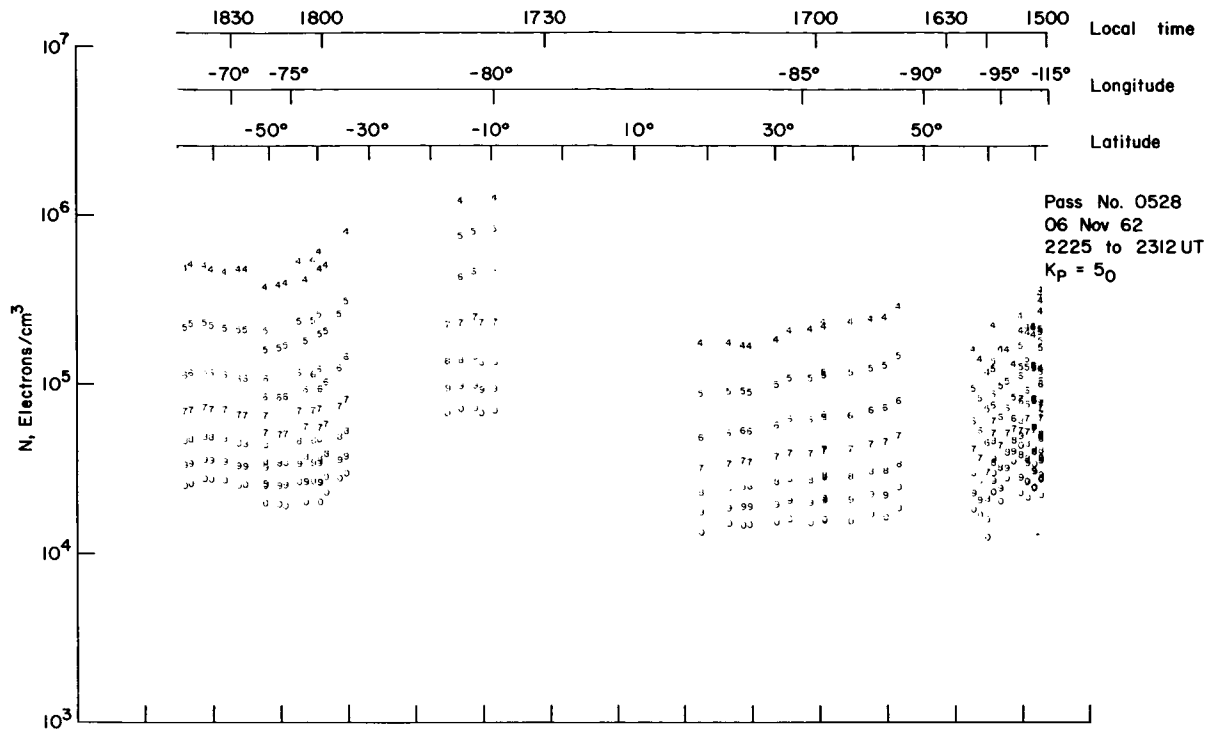

H, km
1400
1200
1000
800
600
400
200
0
−60 −40 −20 0 20 40 60 80
Dip latitude, deg

Figure 7


1830
1800
1730
1700
1630
1500
Local time
-70°
-75°
-80°
-85°
-90°
-95°
-115°
Longitude
-50°
-30°
-10°
10°
30°
50°
Latitude
Pass No. 0528
06 Nov 62
2225 to 2312 UT
$K_P = 5_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3

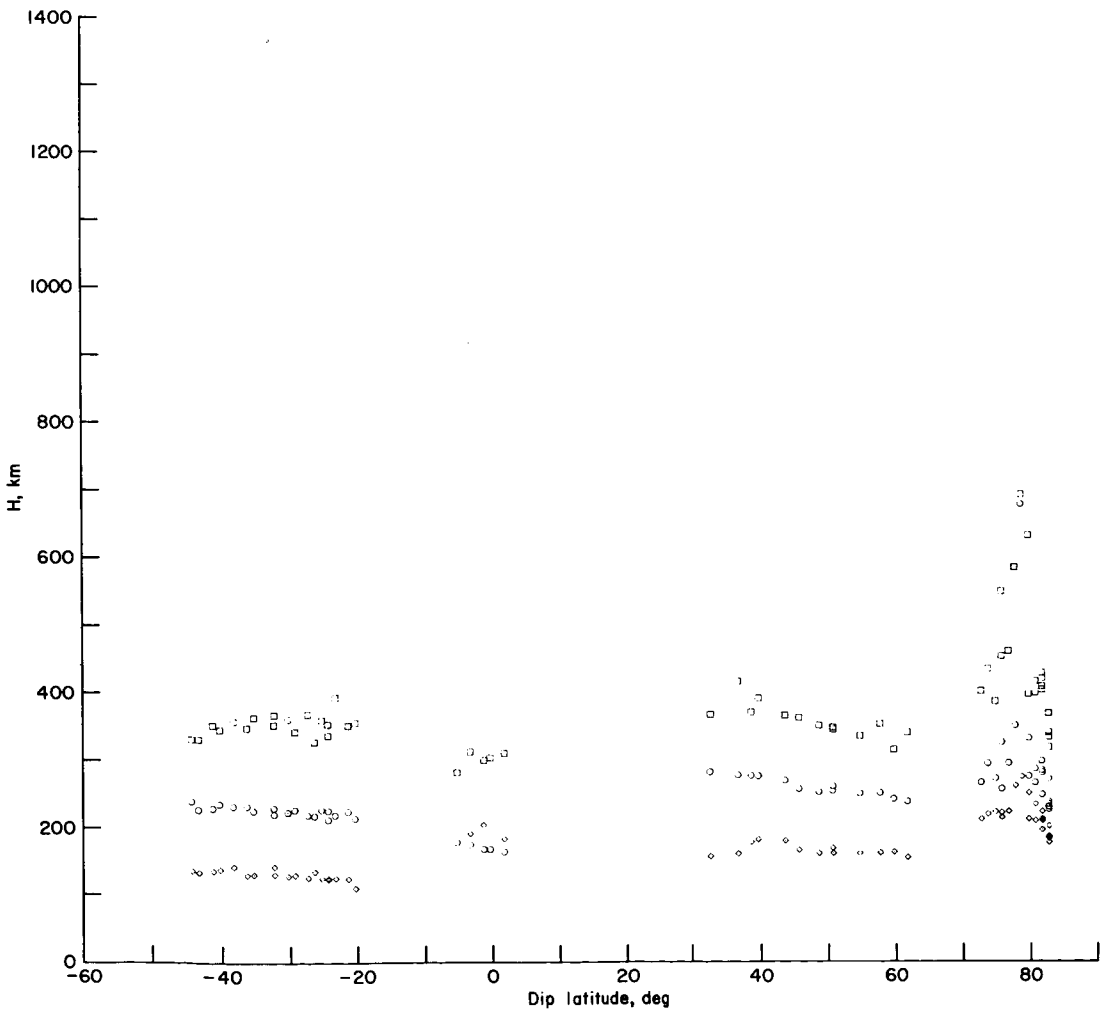

1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 8

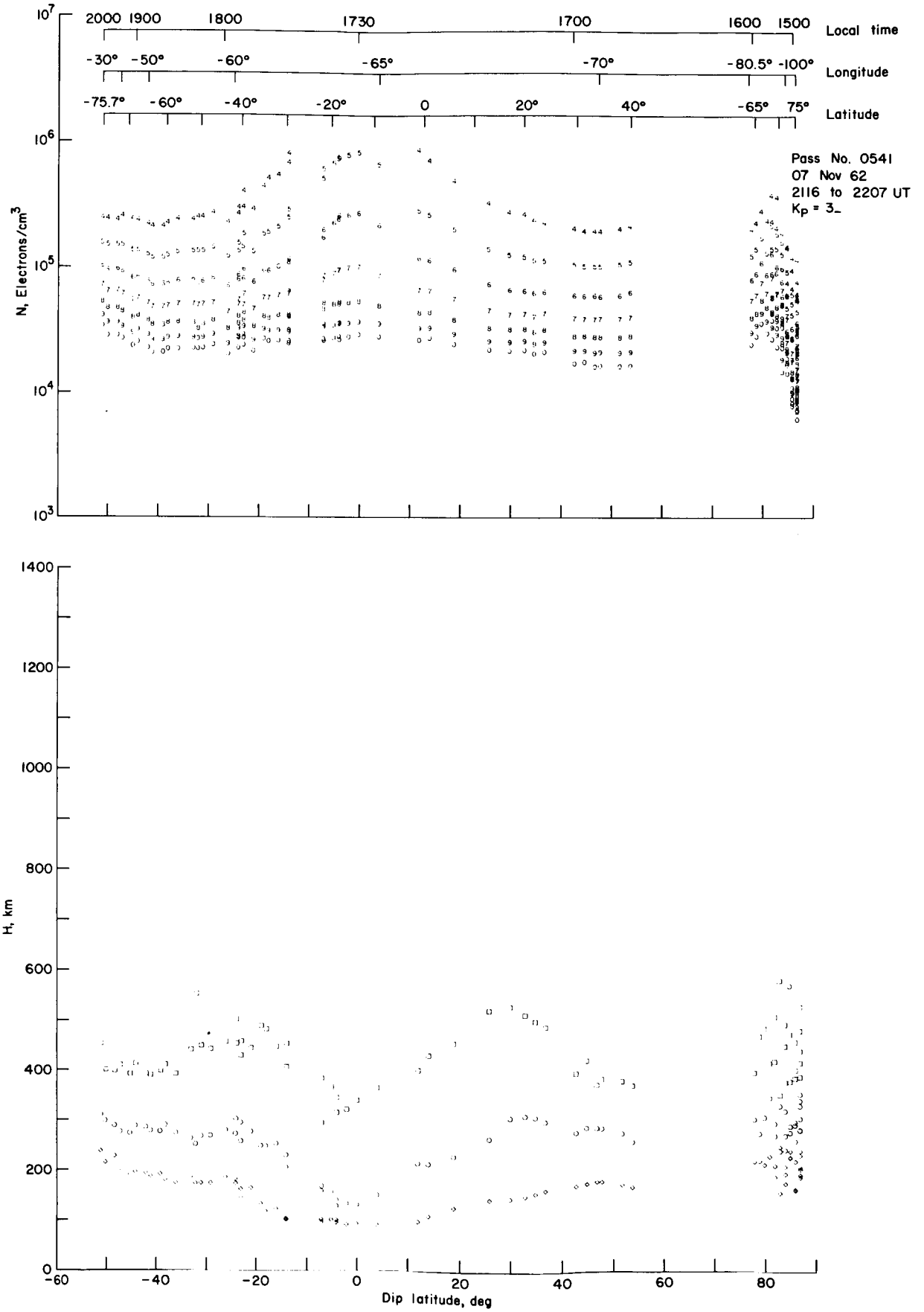

2000 1900 1800 1730 1700 1600 1500
Local time
-30° -50° -60° -65° -70° -80.5° -100°
Longitude
-75.7° -60° -40° -20° 0 20° 40° -65° 75°
Latitude
Pass No. 0541
07 Nov 62
2116 to 2207 UT
K_P = 3_
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 9

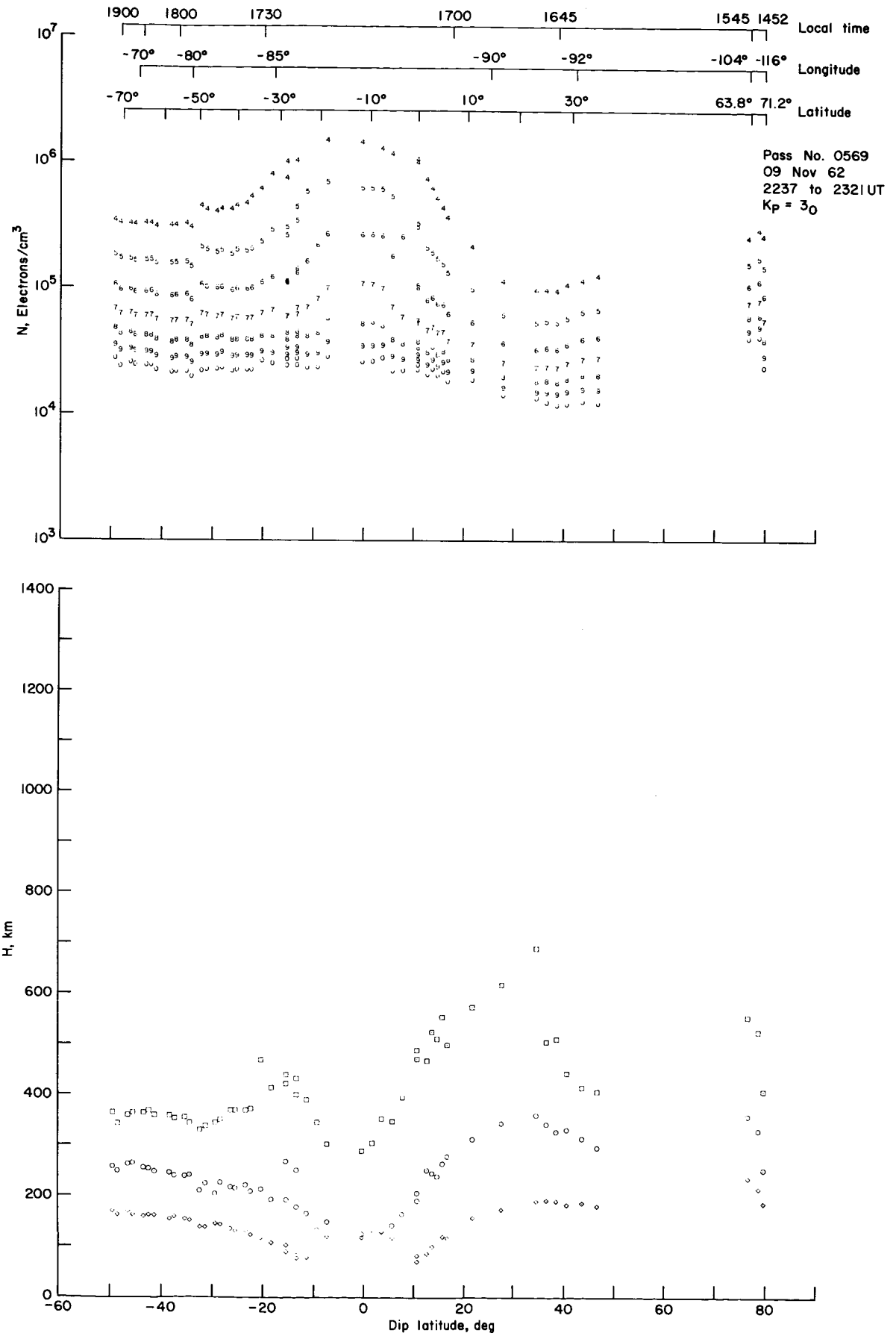

1900 1800 1730 1700 1645 1545 1452 Local time
-70° -80° -85° -90° -92° -104° -116° Longitude
-70° -50° -30° -10° 10° 30° 63.8° 71.2° Latitude
Pass No. 0569
09 Nov 62
2237 to 2321 UT
Kp = 3o
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 10

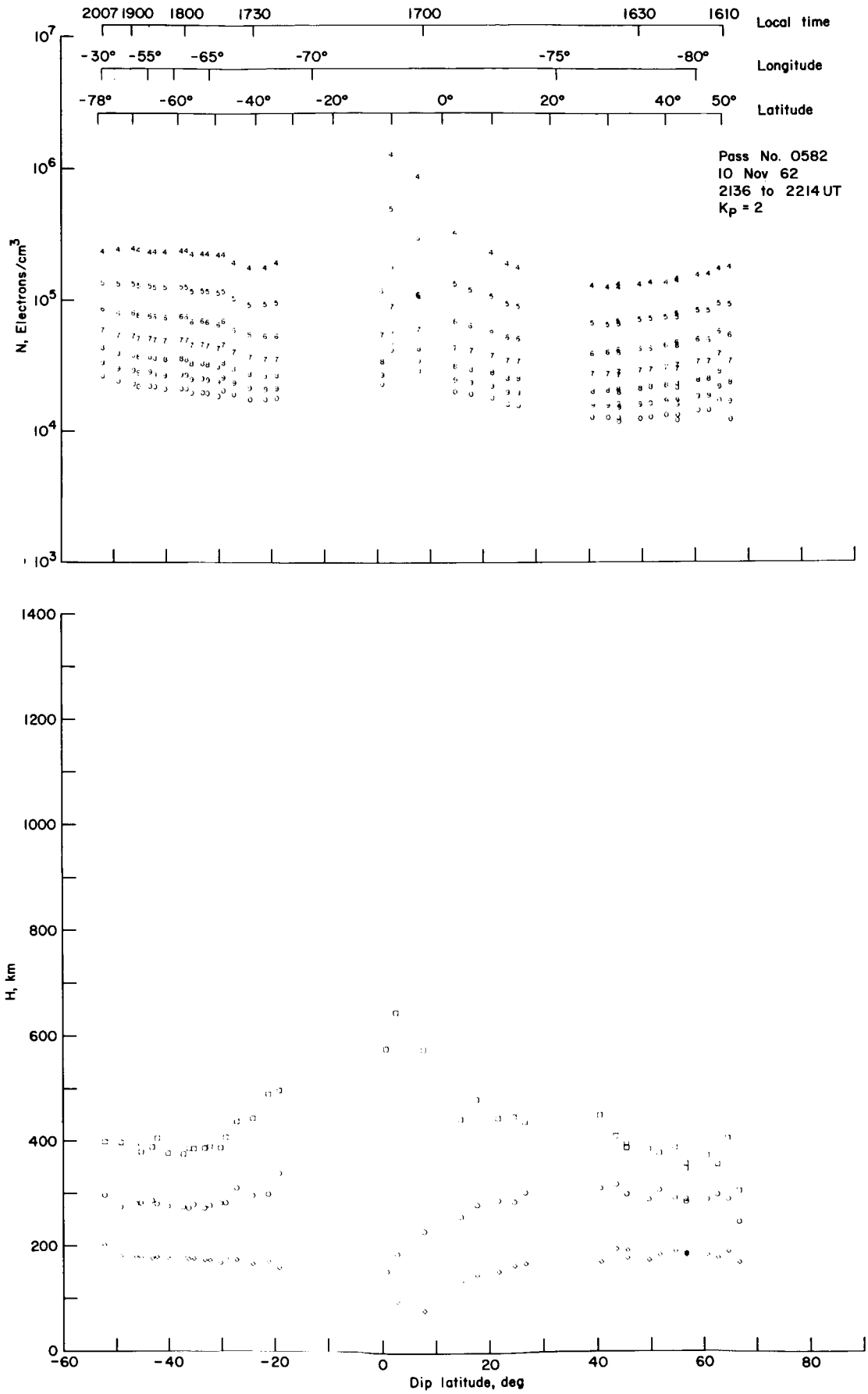
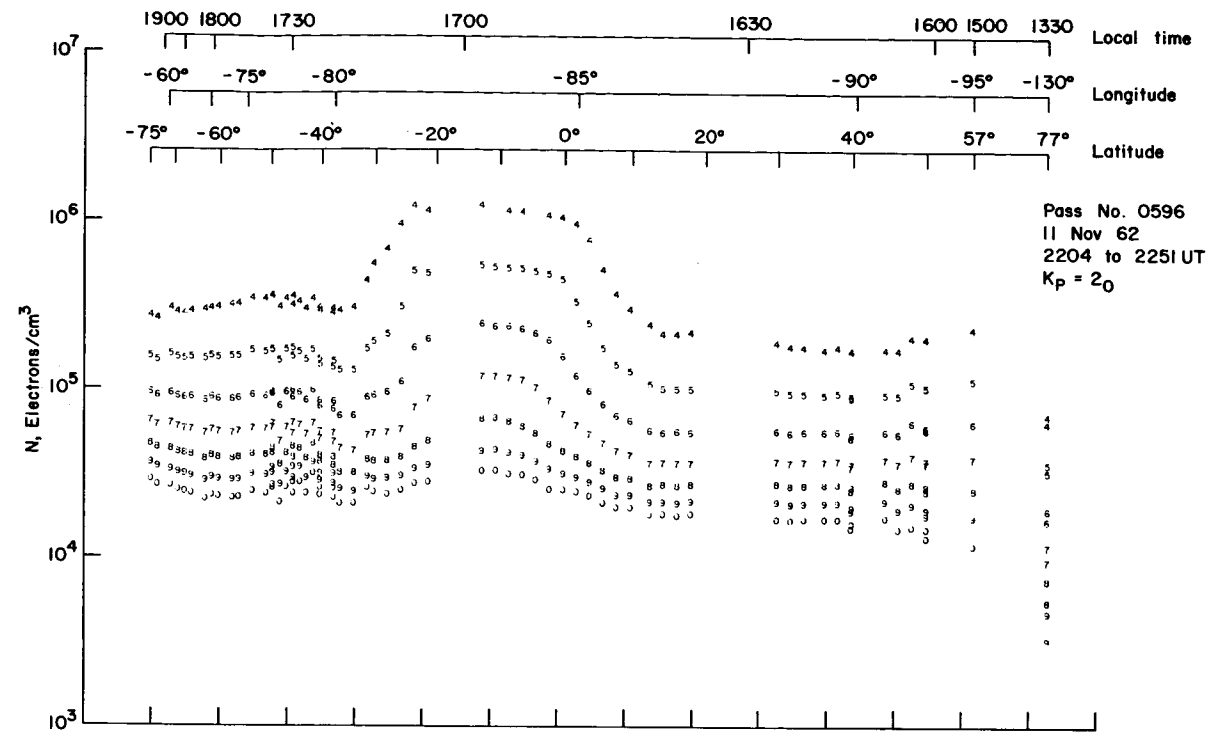

2007 1900 1800 1730 1700 1630 1610
Local time
-30° -55° -65° -70° -75° -80°
Longitude
-78° -60° -40° -20° 0° 20° 40° 50°
Latitude
Pass No. 0582
10 Nov 62
2136 to 2214 UT
Kp = 2
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 11


1900 1800 1730 1700 1630 1600 1500 1330
Local time
-60° -75° -80° -85° -90° -95° -130°
Longitude
-75° -60° -40° -20° 0° 20° 40° 57° 77°
Latitude
Pass No. 0596
11 Nov 62
2204 to 2251 UT
$K_P = 2_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

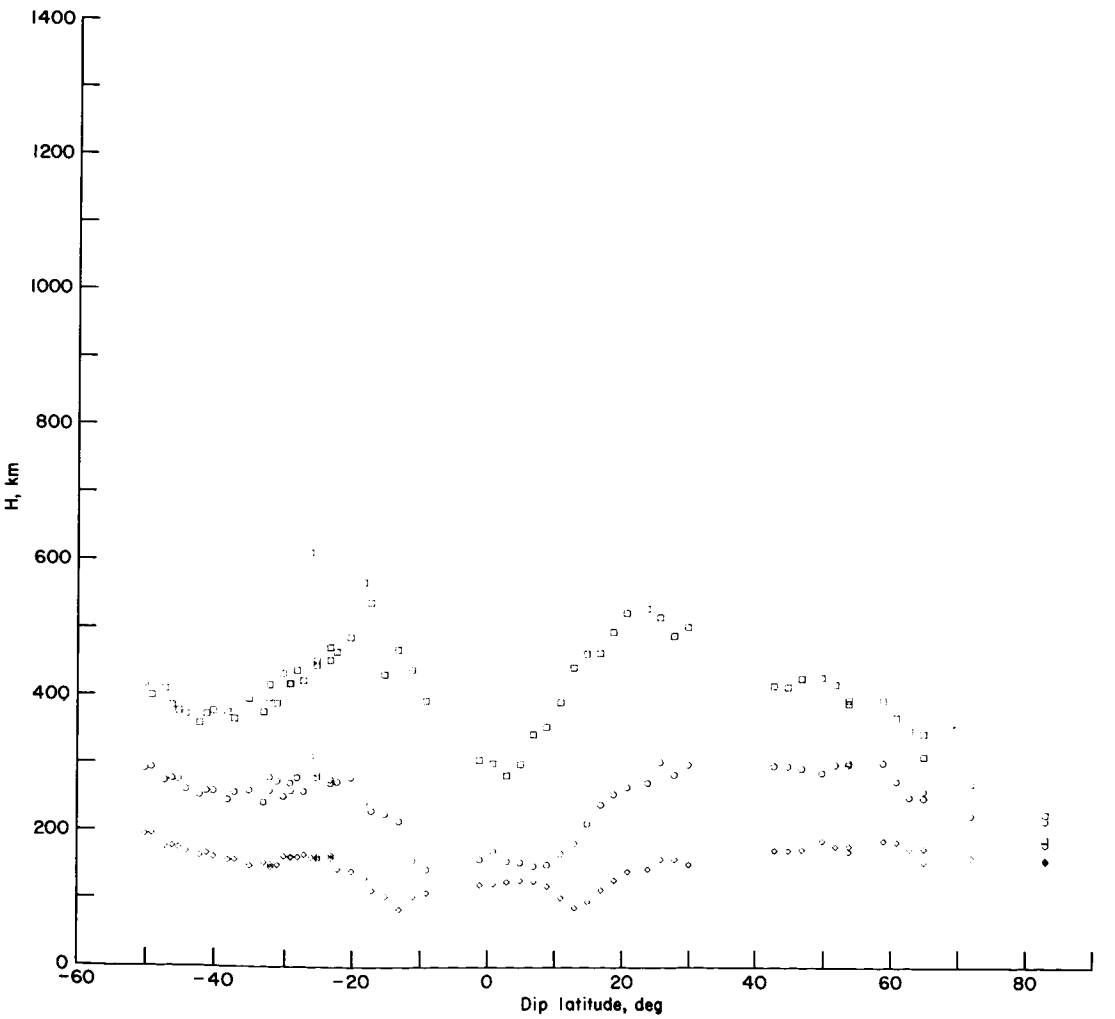

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 12

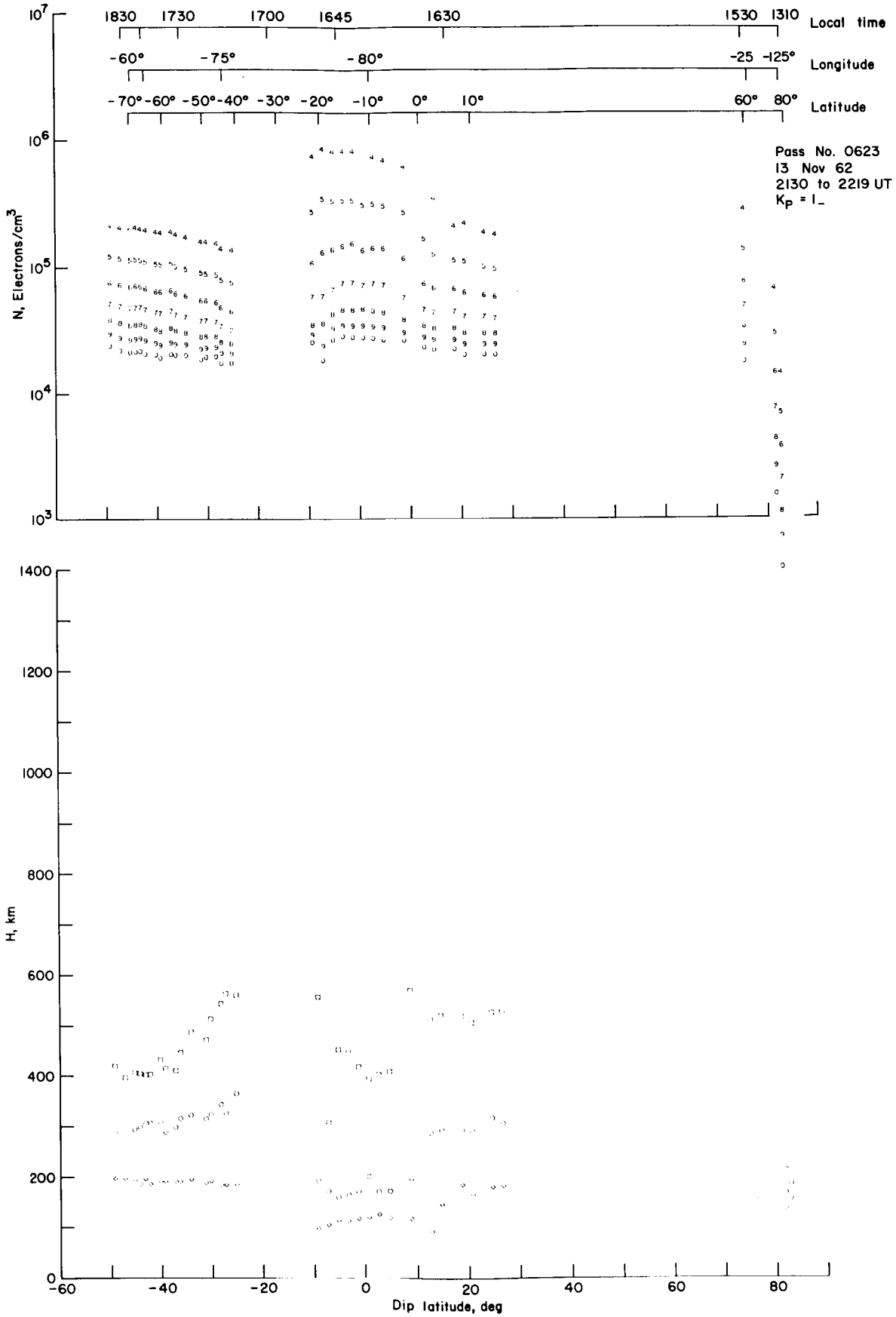
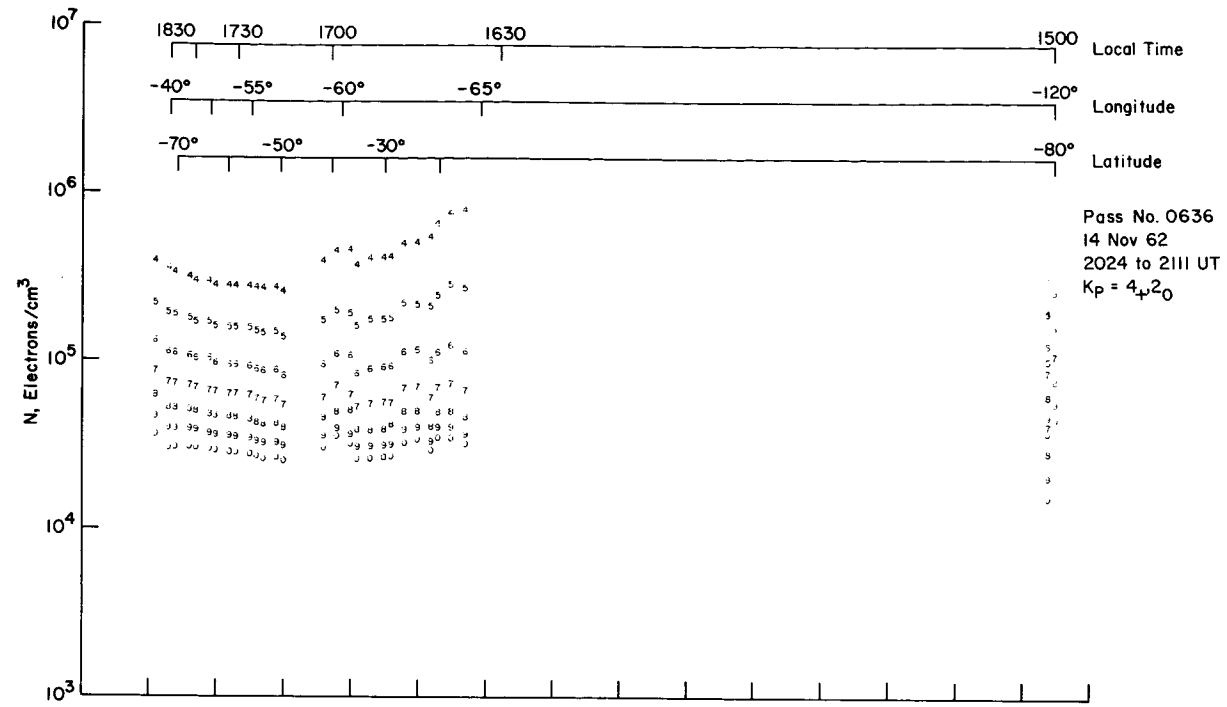

1830 1730 1700 1645 1630 1530 1310 Local time
-60° -75° -80° -25 -125° Longitude
-70° -60° -50° -40° -30° -20° -10° 0° 10° 60° 80° Latitude
Pass No. 0623
13 Nov 62
2130 to 2219 UT
K_p = 1-
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 13


1830
1730
1700
1630
1500
Local Time
-40°
-55°
-60°
-65°
-120°
Longitude
-70°
-50°
-30°
-80°
Latitude
Pass No. 0636
14 Nov 62
2024 to 2111 UT
$K_P = 4_+2_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3

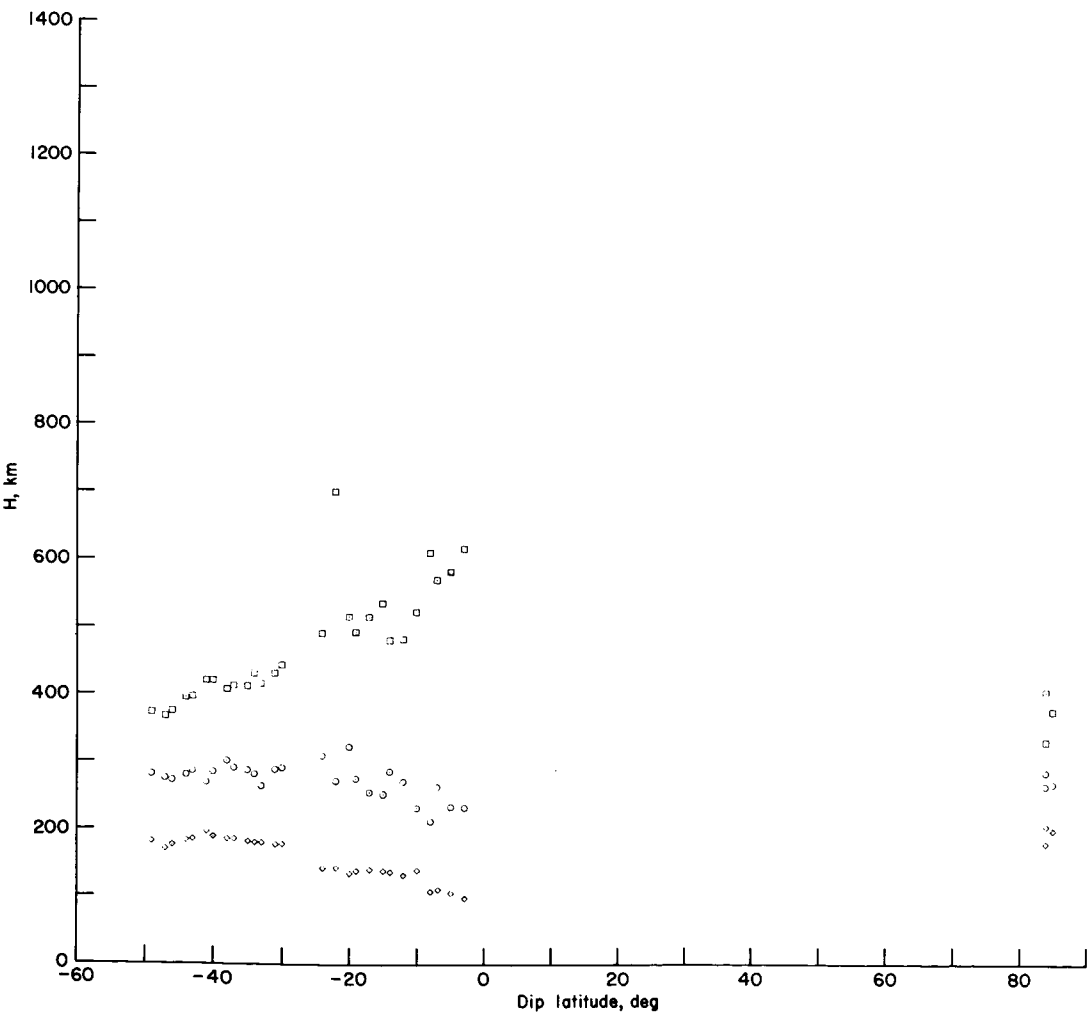

1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 14

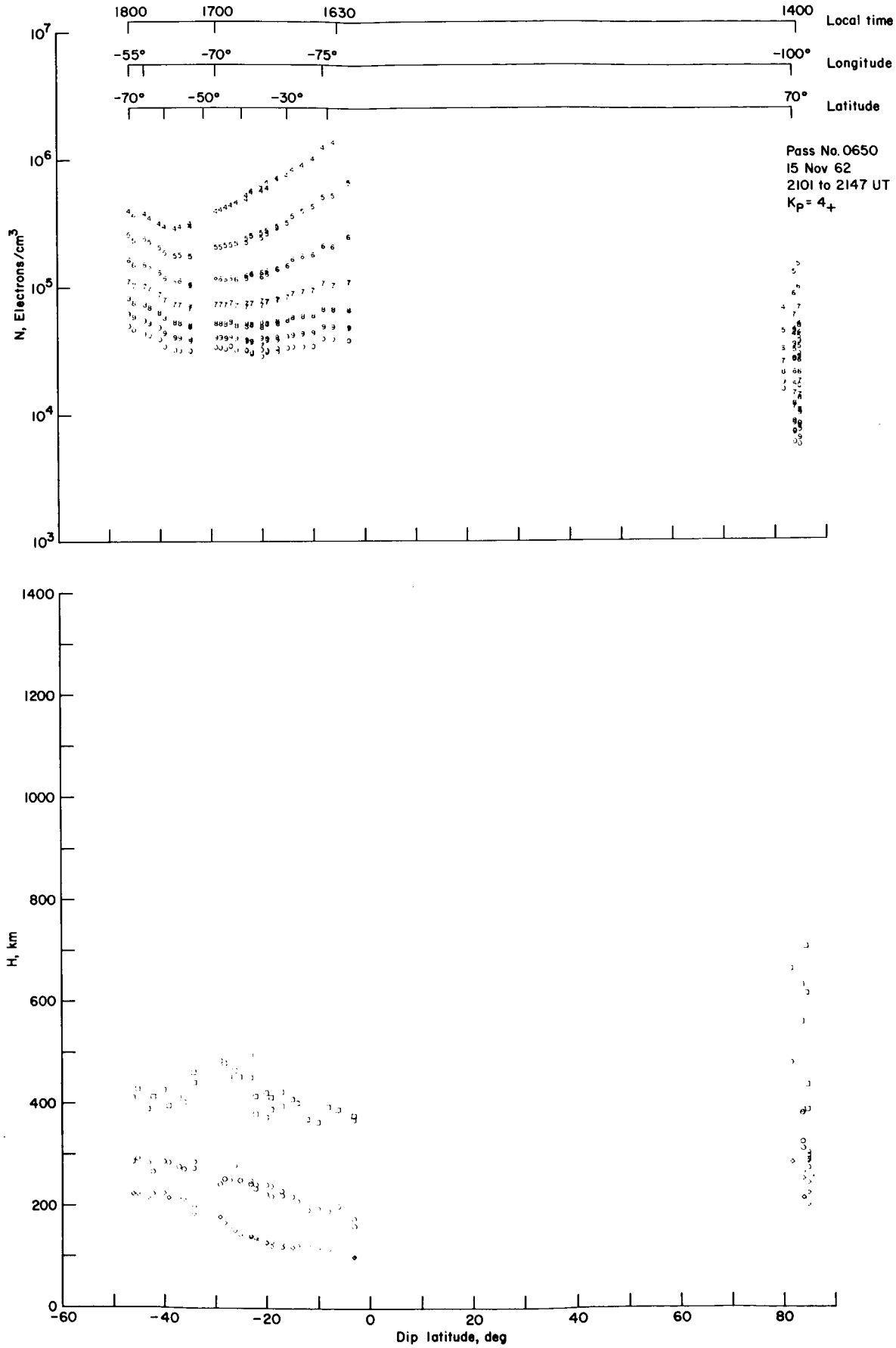
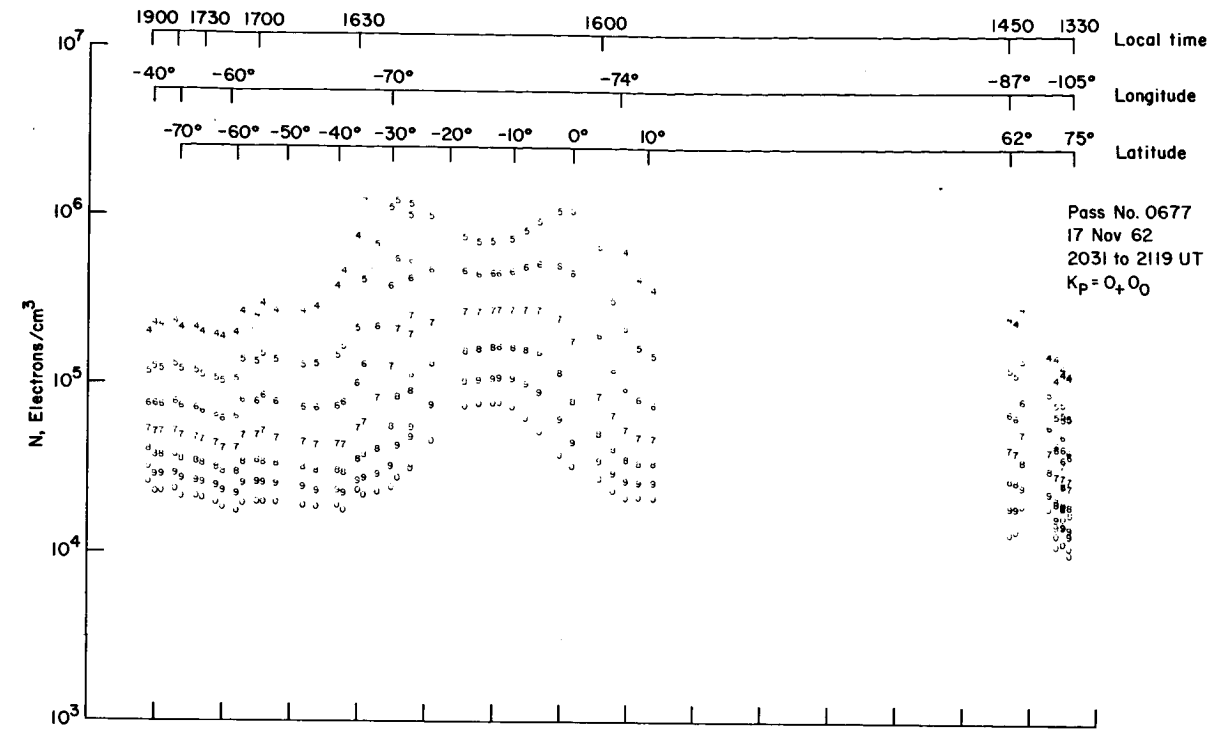

1800
1700
1630
1400
Local time
-55°
-70°
-75°
-100°
Longitude
-70°
-50°
-30°
70°
Latitude
Pass No. 0650
15 Nov 62
2101 to 2147 UT
$K_p = 4_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 15


1900 1730 1700 1630 1600 1450 1330
Local time
-40° -60° -70° -74° -87° -105°
Longitude
-70° -60° -50° -40° -30° -20° -10° 0° 10° 62° 75°
Latitude
Pass No. 0677
17 Nov 62
2031 to 2119 UT
$K_P = 0_+ 0_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

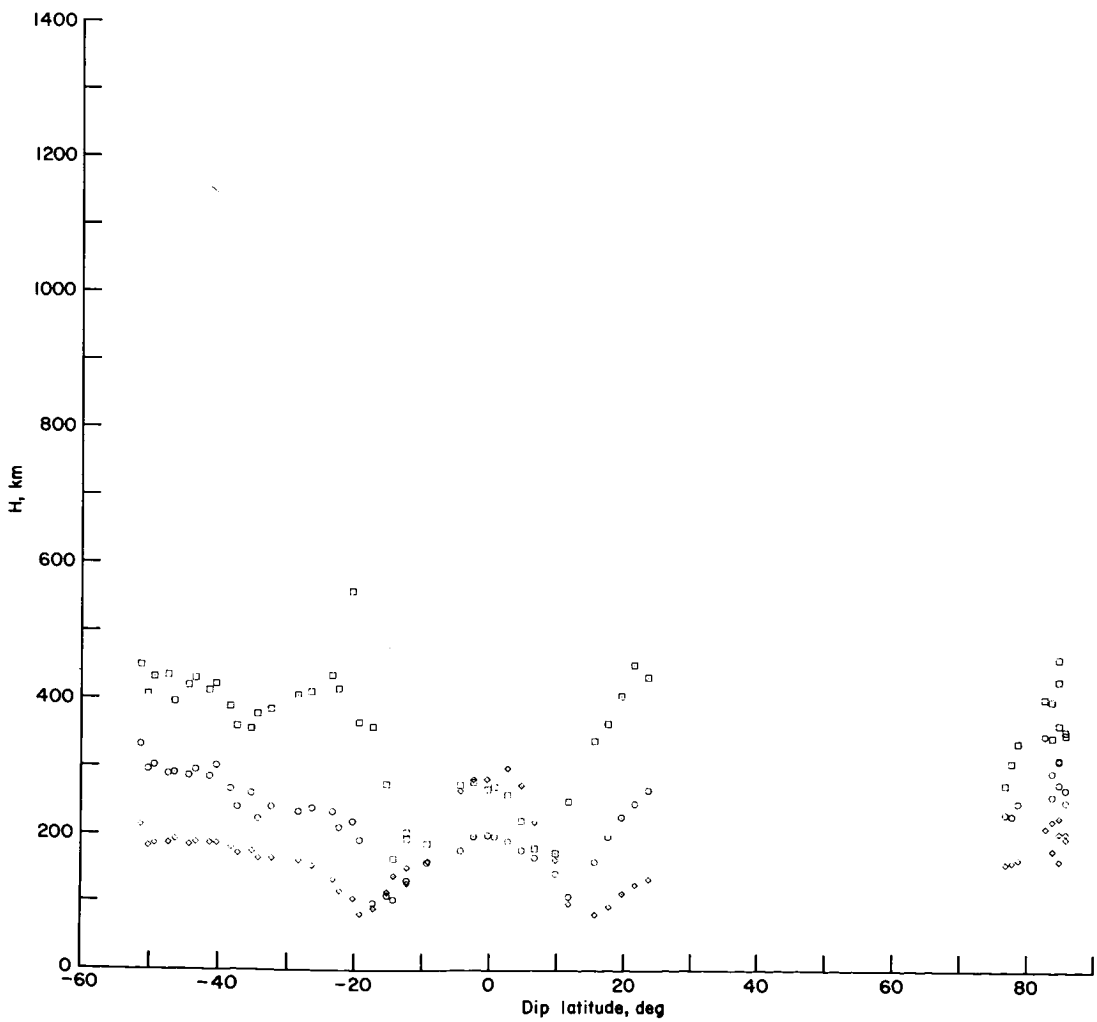

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 16

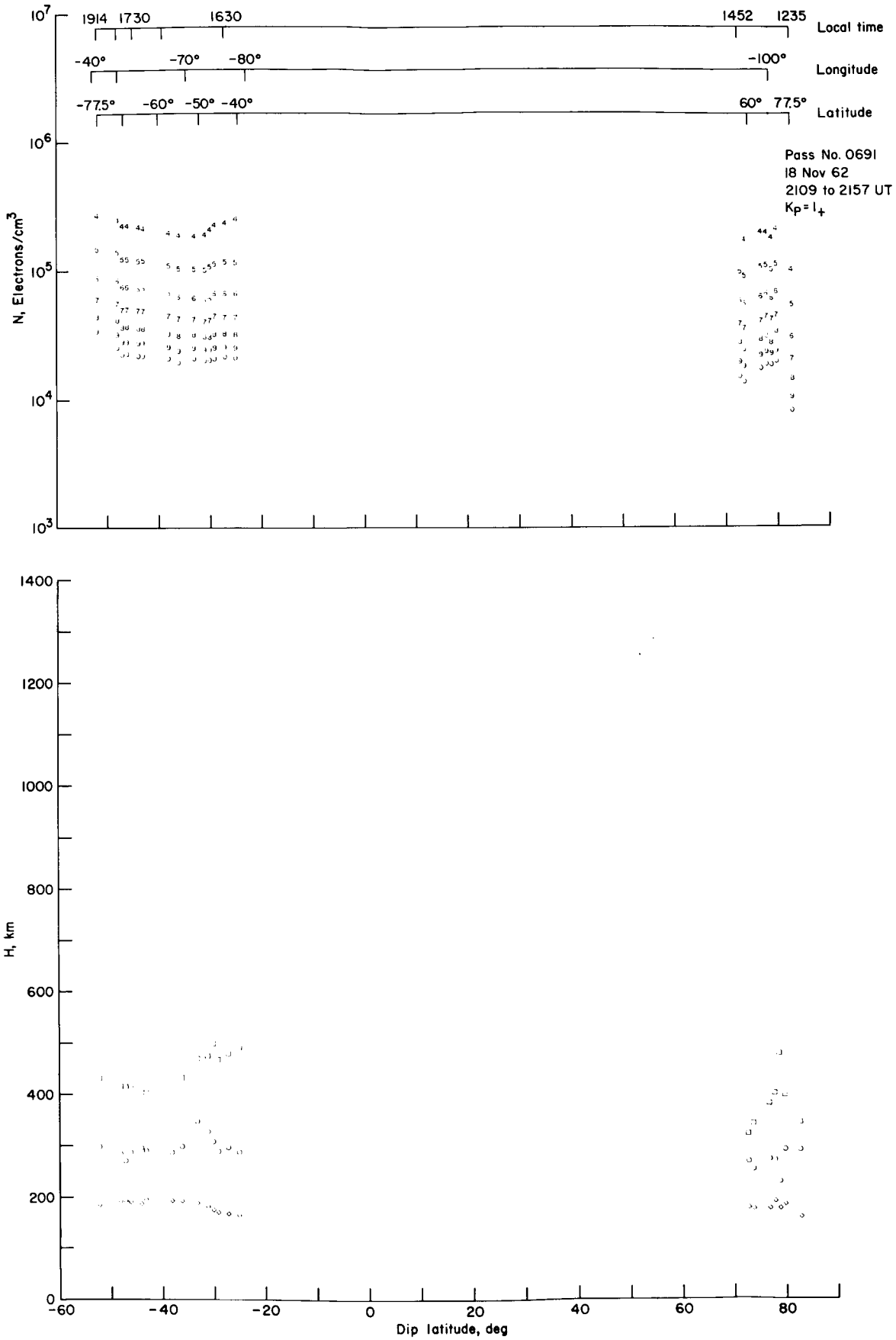

1914 1730 1630 1452 1235
Local time
-40° -70° -80° -100°
Longitude
-77.5° -60° -50° -40° 60° 77.5°
Latitude
Pass No. 0691
18 Nov 62
2109 to 2157 UT
Kp = 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 17

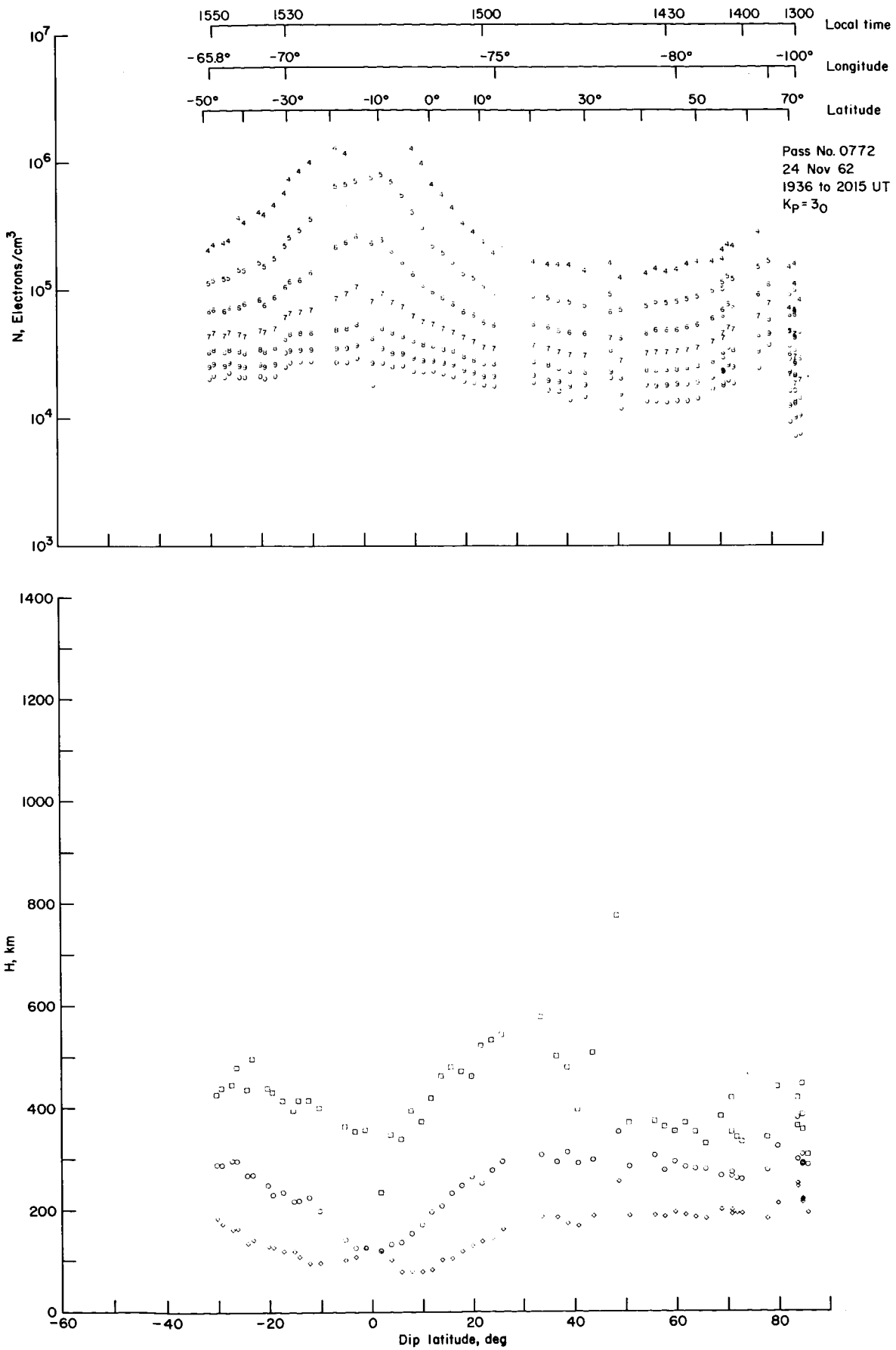
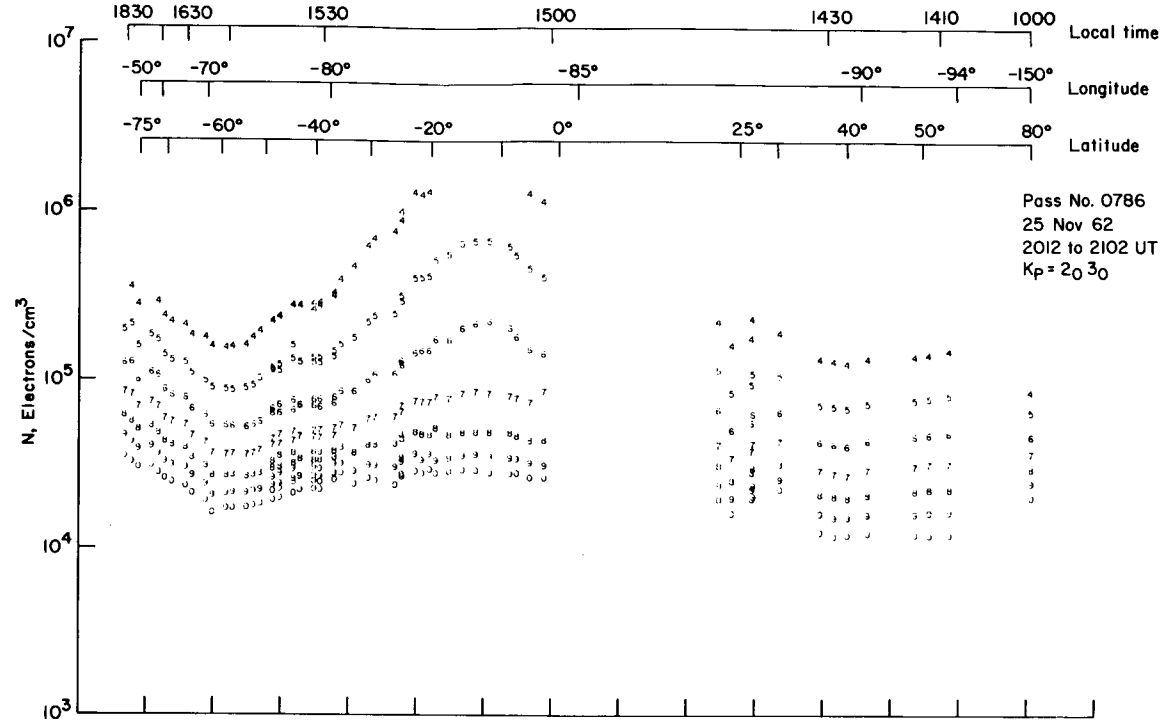

1550
1530
1500
1430
1400
1300
Local time
-65.8°
-70°
-75°
-80°
-100°
Longitude
-50°
-30°
-10°
0°
10°
30°
50
70°
Latitude
Pass No. 0772
24 Nov 62
1936 to 2015 UT
$K_P = 3_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 18


1830 1630 1530 1500 1430 1410 1000
Local time
-50° -70° -80° -85° -90° -94° -150°
Longitude
-75° -60° -40° -20° 0° 25° 40° 50° 80°
Latitude
Pass No. 0786
25 Nov 62
2012 to 2102 UT
$K_P = 2_0\,3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

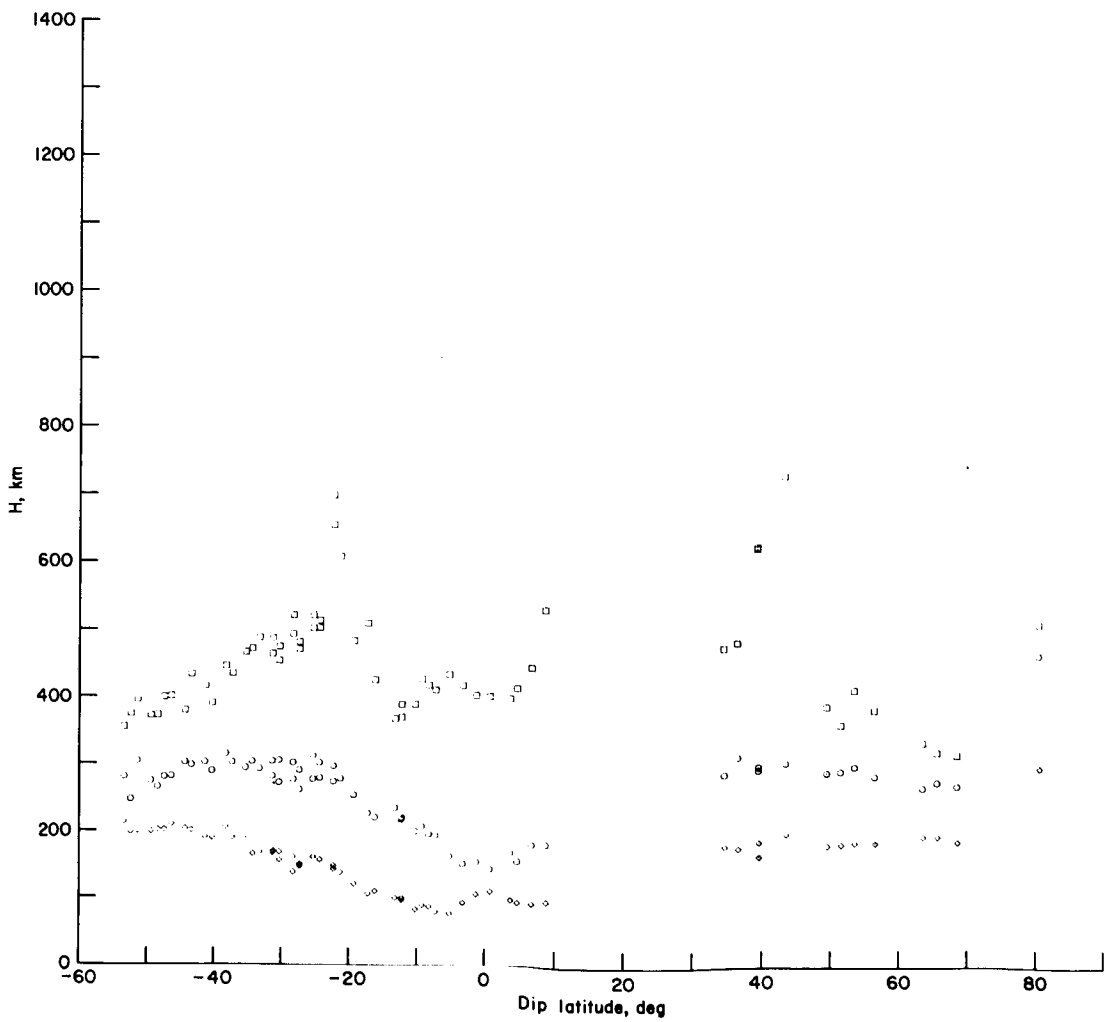
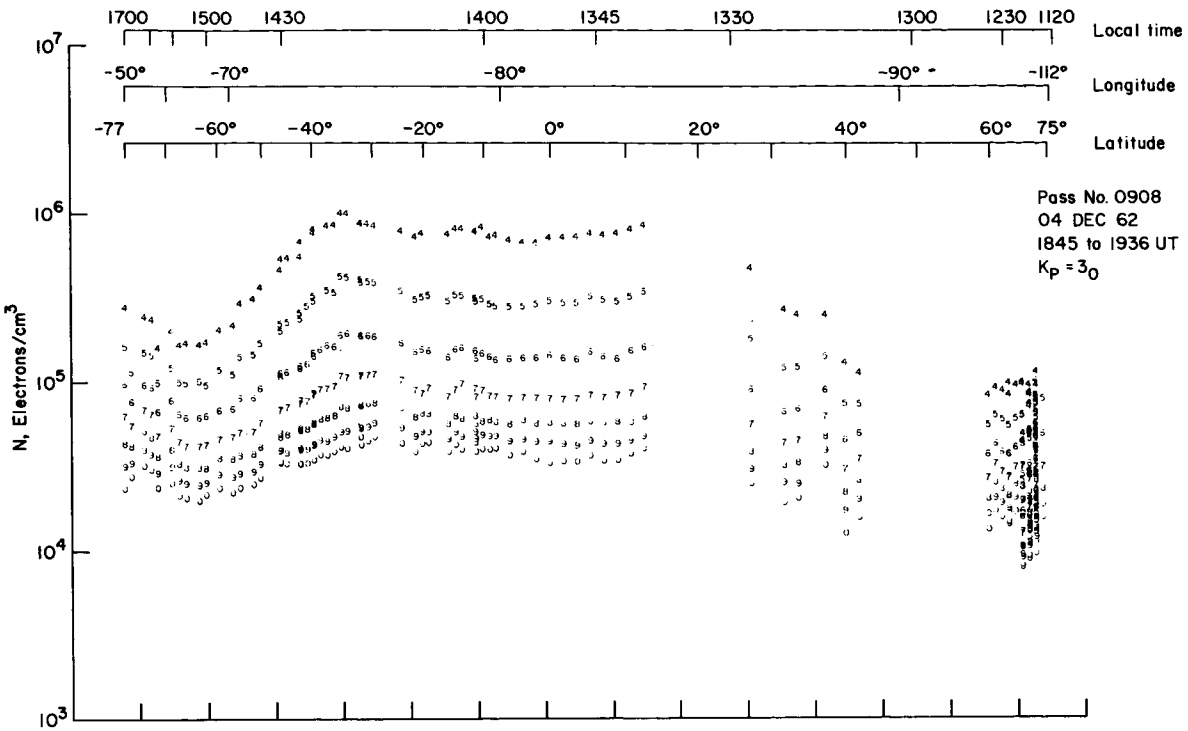

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 19


1700 1500 1430 1400 1345 1330 1300 1230 1120
Local time
-50° -70° -80° -90° -112°
Longitude
-77 -60° -40° -20° 0° 20° 40° 60° 75°
Latitude
Pass No. 0908
04 DEC 62
1845 to 1936 UT
$K_P = 3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

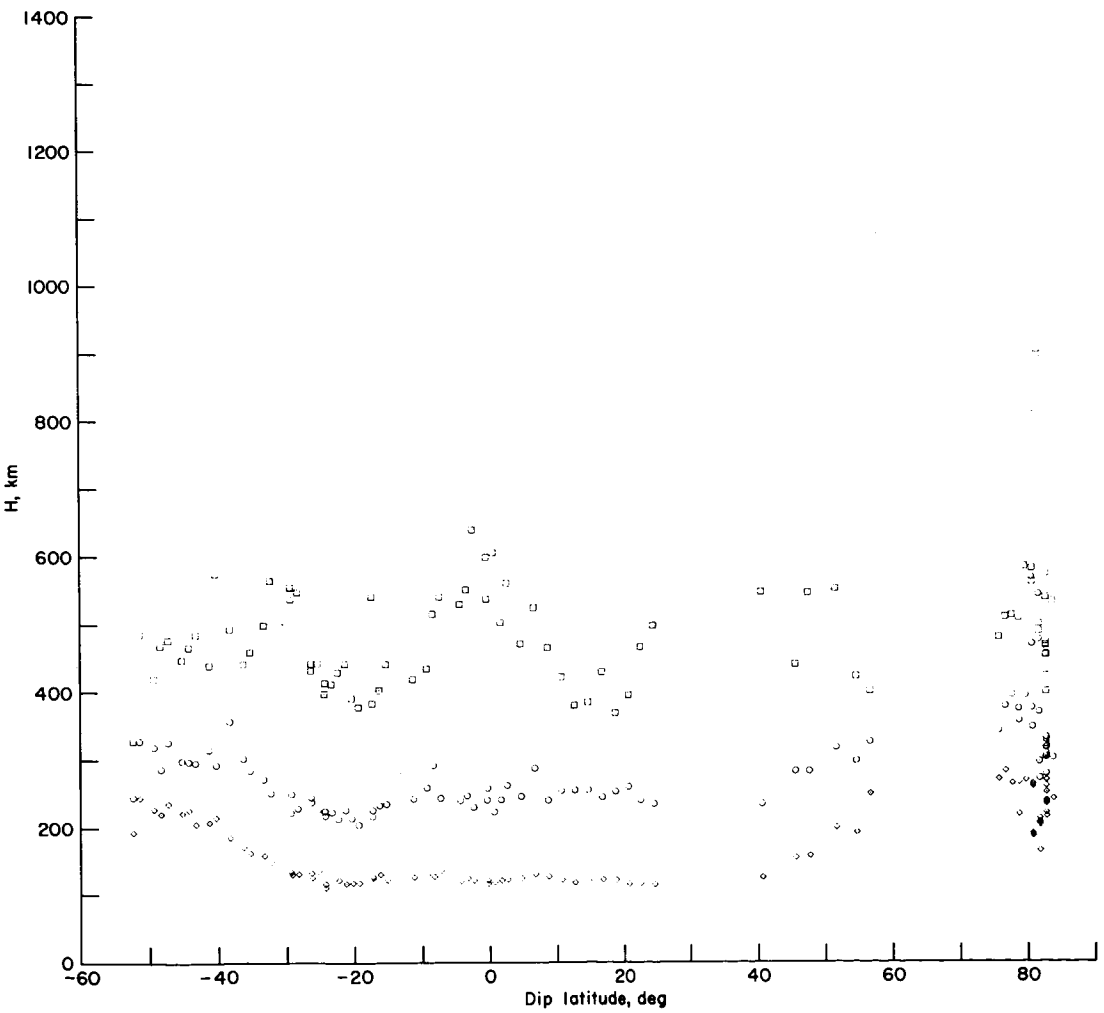

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 20

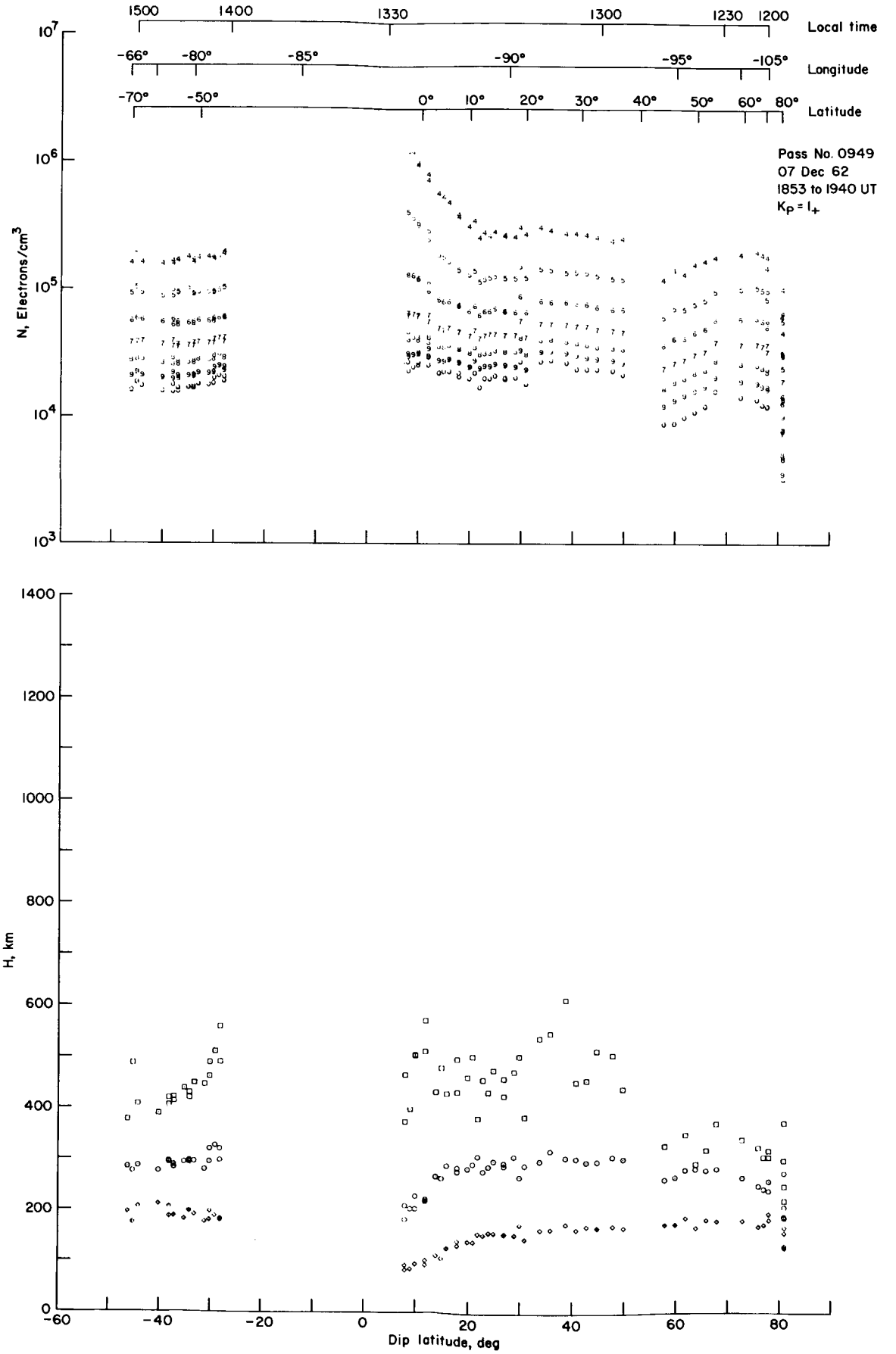
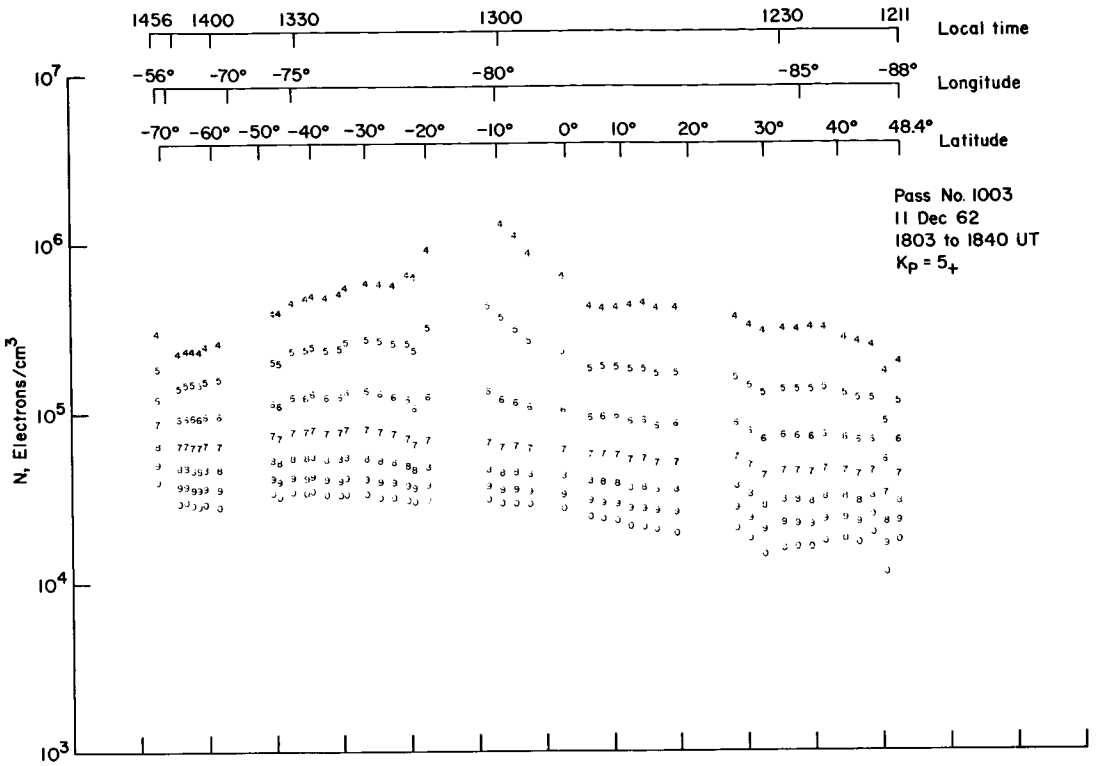

1500
1400
1330
1300
1230
1200
Local time
-66°
-80°
-85°
-90°
-95°
-105°
Longitude
-70°
-50°
0°
10°
20°
30°
40°
50°
60°
80°
Latitude
Pass No. 0949
07 Dec 62
1853 to 1940 UT
Kp = 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 21


1456 1400 1330 1300 1230 1211
Local time
-56° -70° -75° -80° -85° -88°
Longitude
-70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 48.4°
Latitude
Pass No. 1003
11 Dec 62
1803 to 1840 UT
$K_p = 5_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3

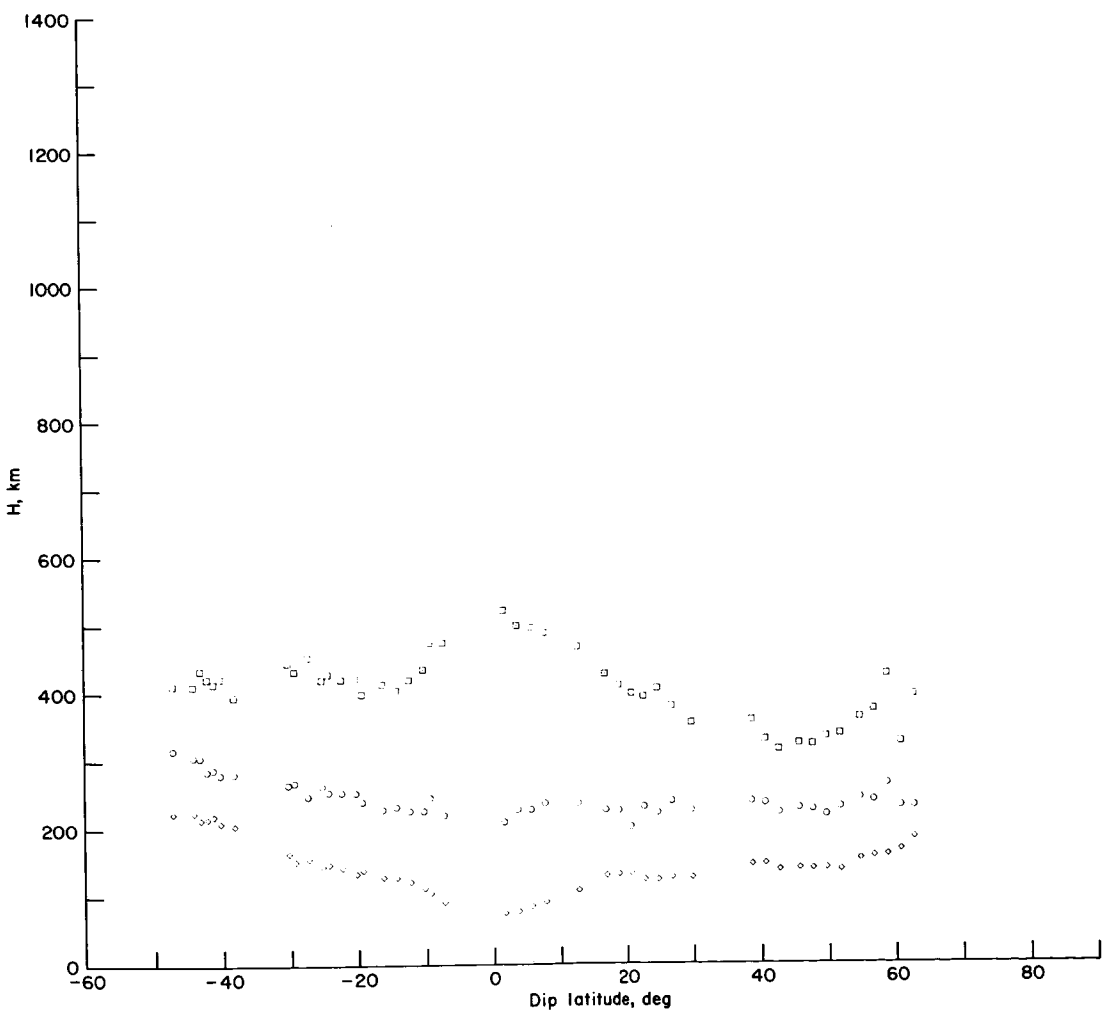

1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 22

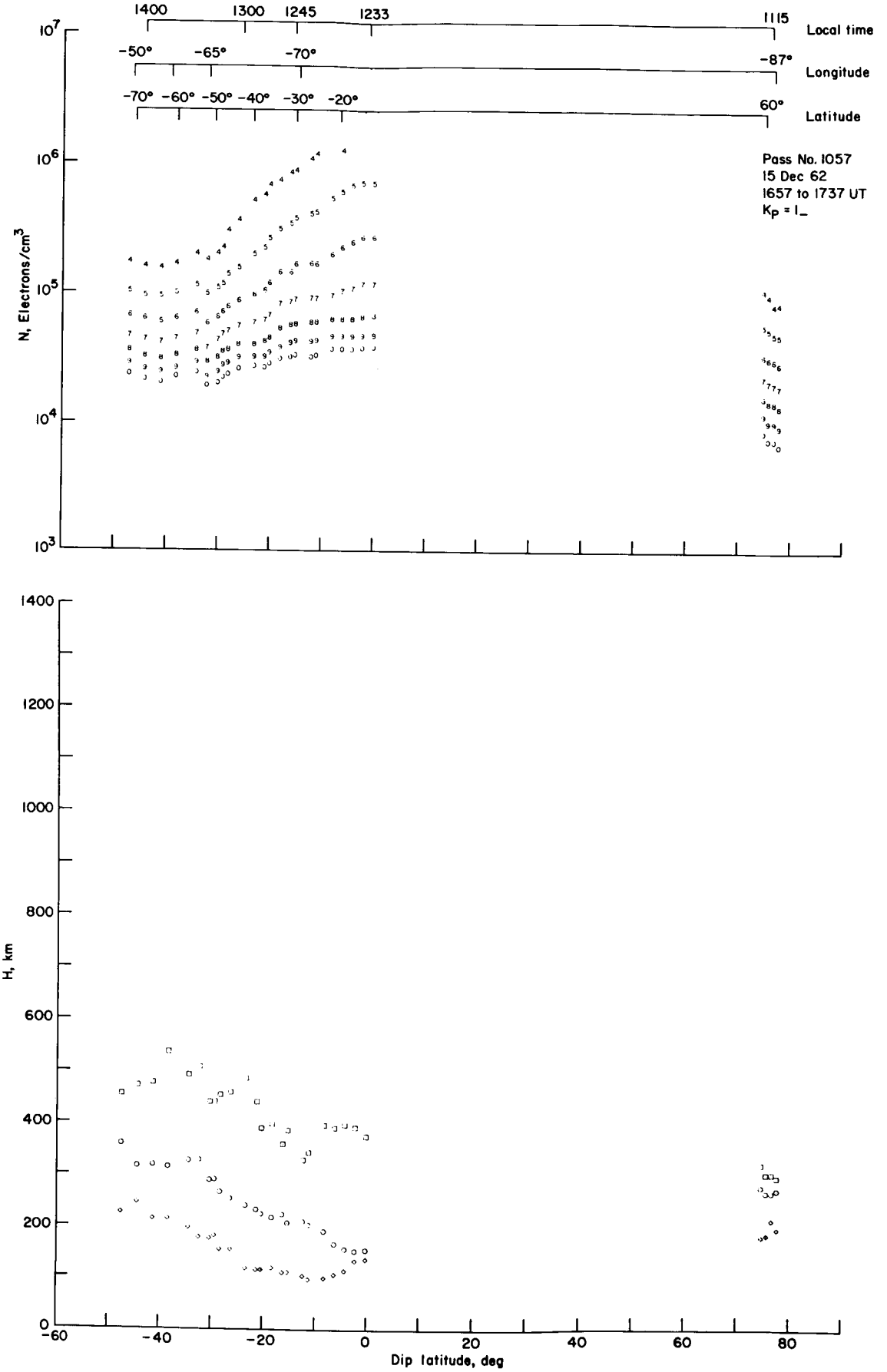

1400
1300
1245
1233
1115
Local time
-50°
-65°
-70°
-87°
Longitude
-70° -60° -50° -40° -30° -20°
60°
Latitude
Pass No. 1057
15 Dec 62
1657 to 1737 UT
Kp = 1_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 23

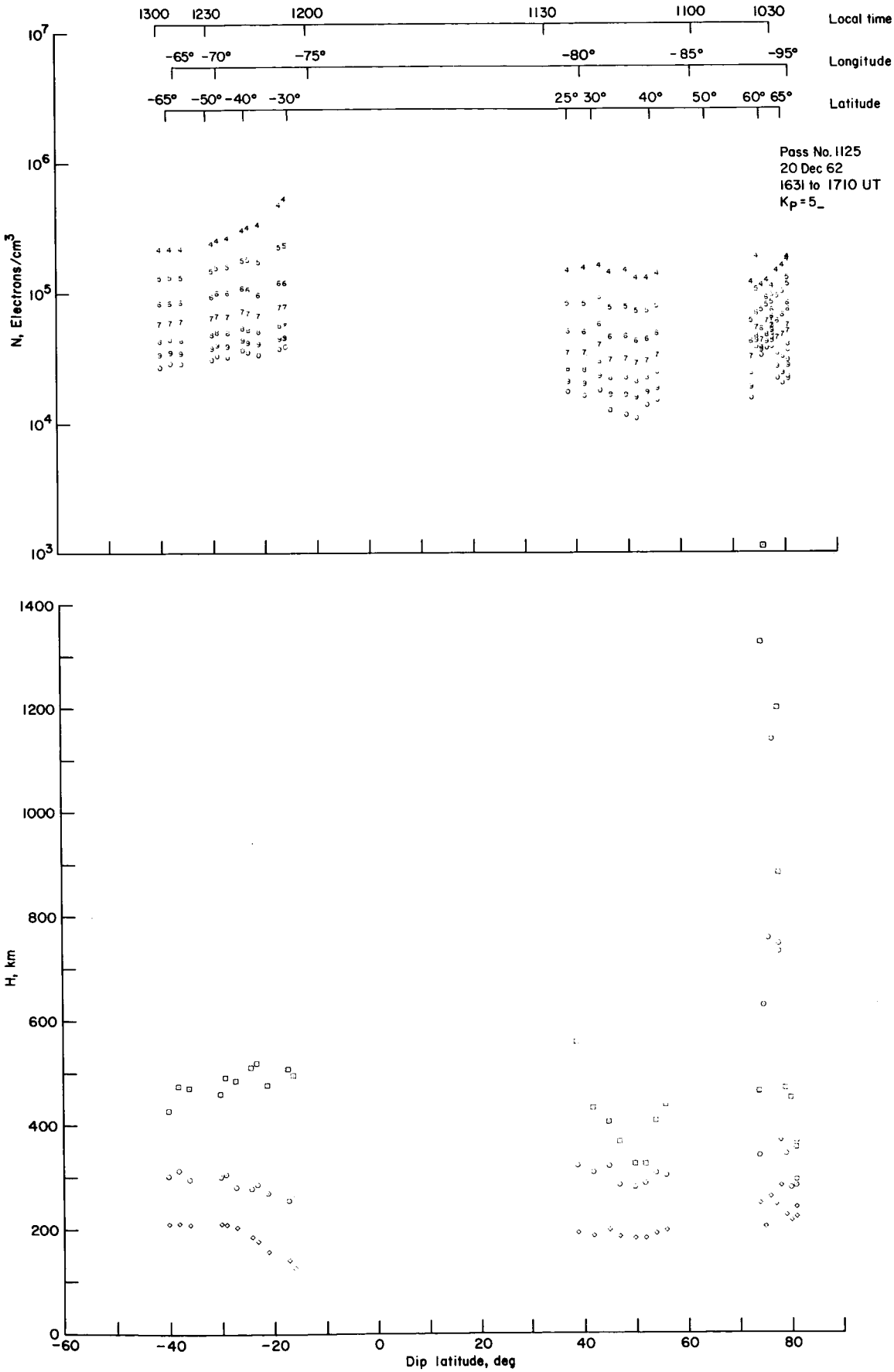

1300 1230 1200 1130 1100 1030
Local time
-65° -70° -75° -80° -85° -95°
Longitude
-65° -50° -40° -30° 25° 30° 40° 50° 60° 65°
Latitude
Pass No. 1125
20 Dec 62
1631 to 1710 UT
Kp = 5_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 24

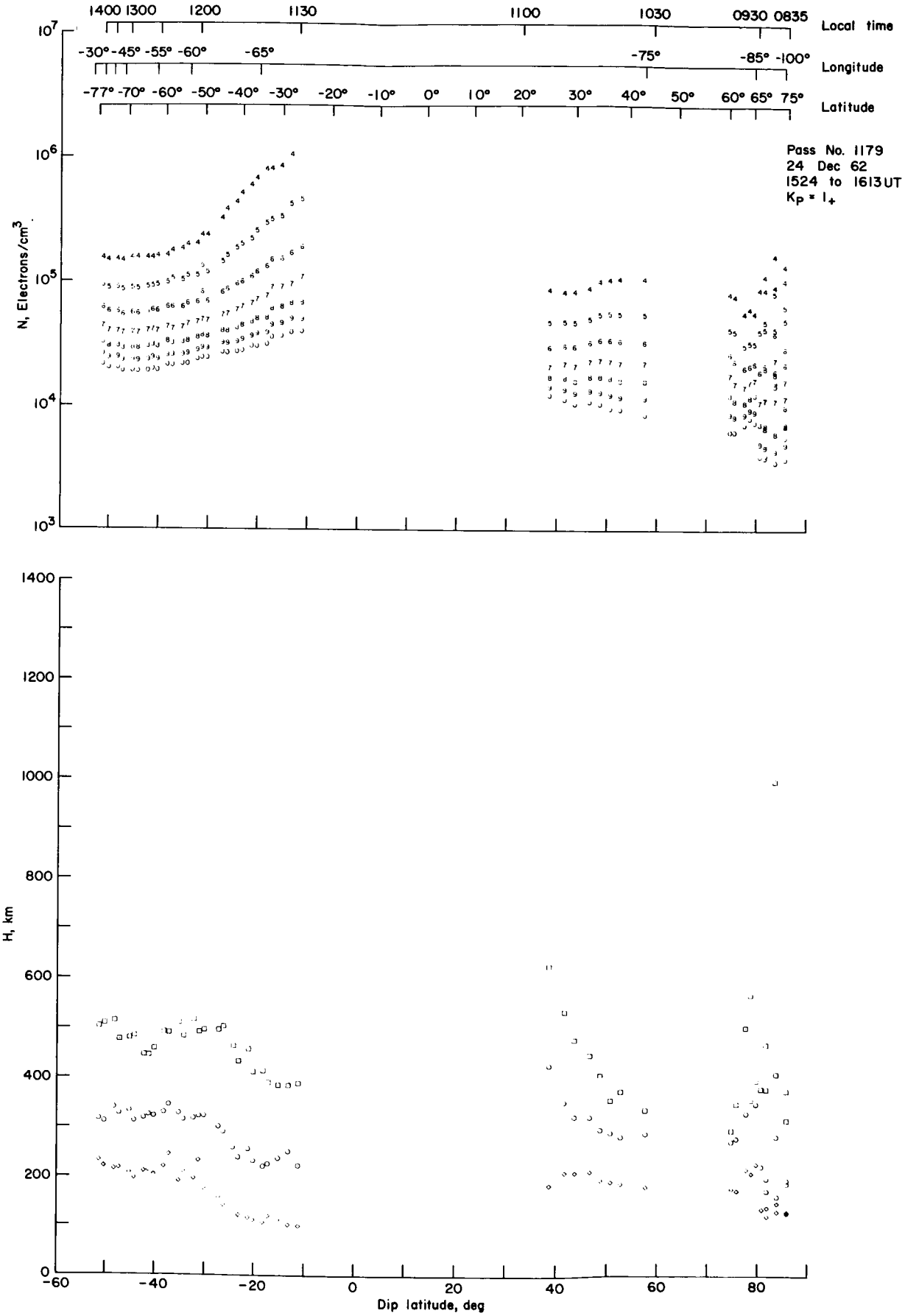
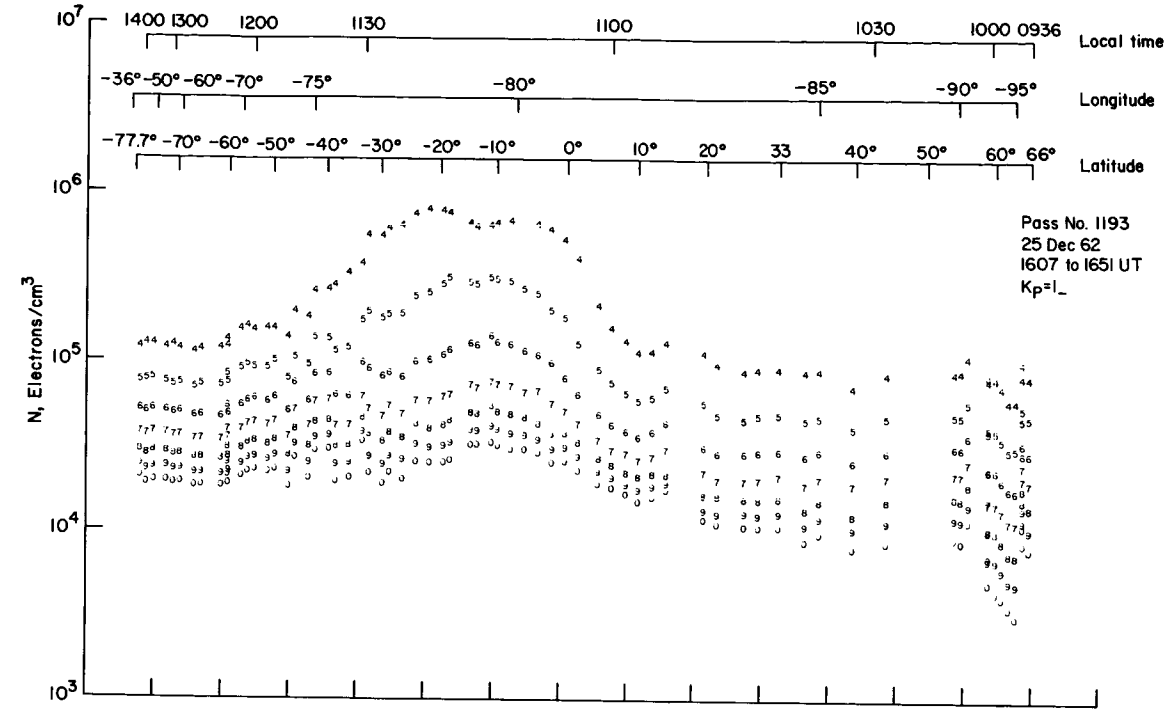

1400 1300 1200 1130 1100 1030 0930 0835
Local time
-30° -45° -55° -60° -65° -75° -85° -100°
Longitude
-77° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 65° 75°
Latitude
Pass No. 1179
24 Dec 62
1524 to 1613 UT
$K_P = 1_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 25


1400 1300 1200 1130 1100 1030 1000 0936
Local time
-36° -50° -60° -70° -75° -80° -85° -90° -95°
Longitude
-77.7° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 33 40° 50° 60° 66°
Latitude
Pass No. 1193
25 Dec 62
1607 to 1651 UT
Kp=1_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

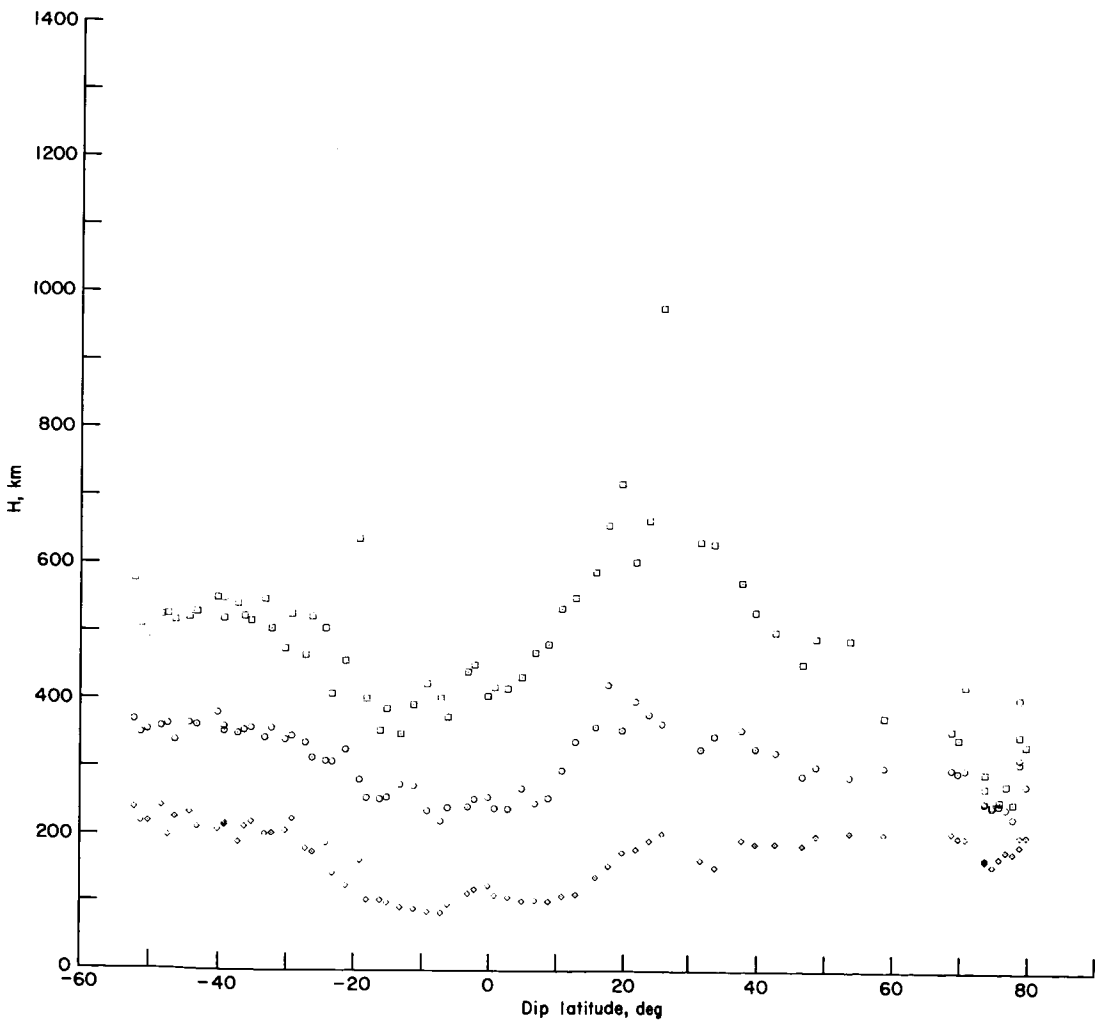
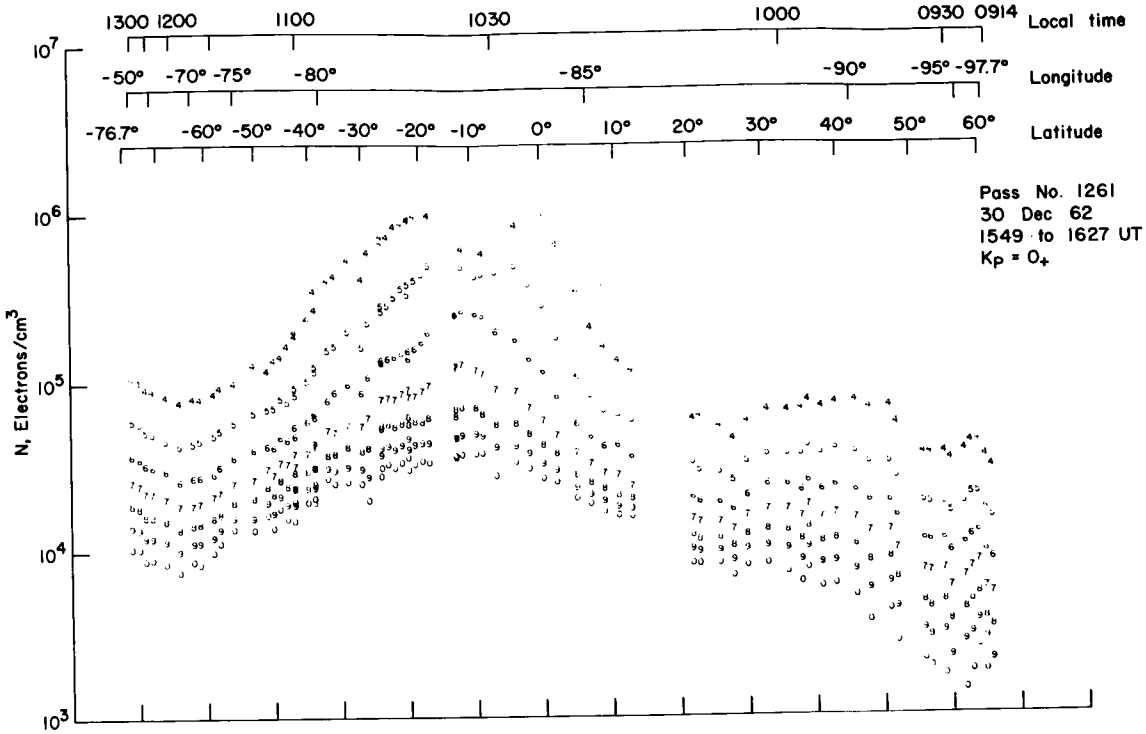

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 26


1300 1200
1100
1030
1000
0930 0914
Local time
-50° -70° -75°
-80°
-85°
-90°
-95° -97.7°
Longitude
-76.7° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60°
Latitude
Pass No. 1261
30 Dec 62
1549 to 1627 UT
Kp = 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

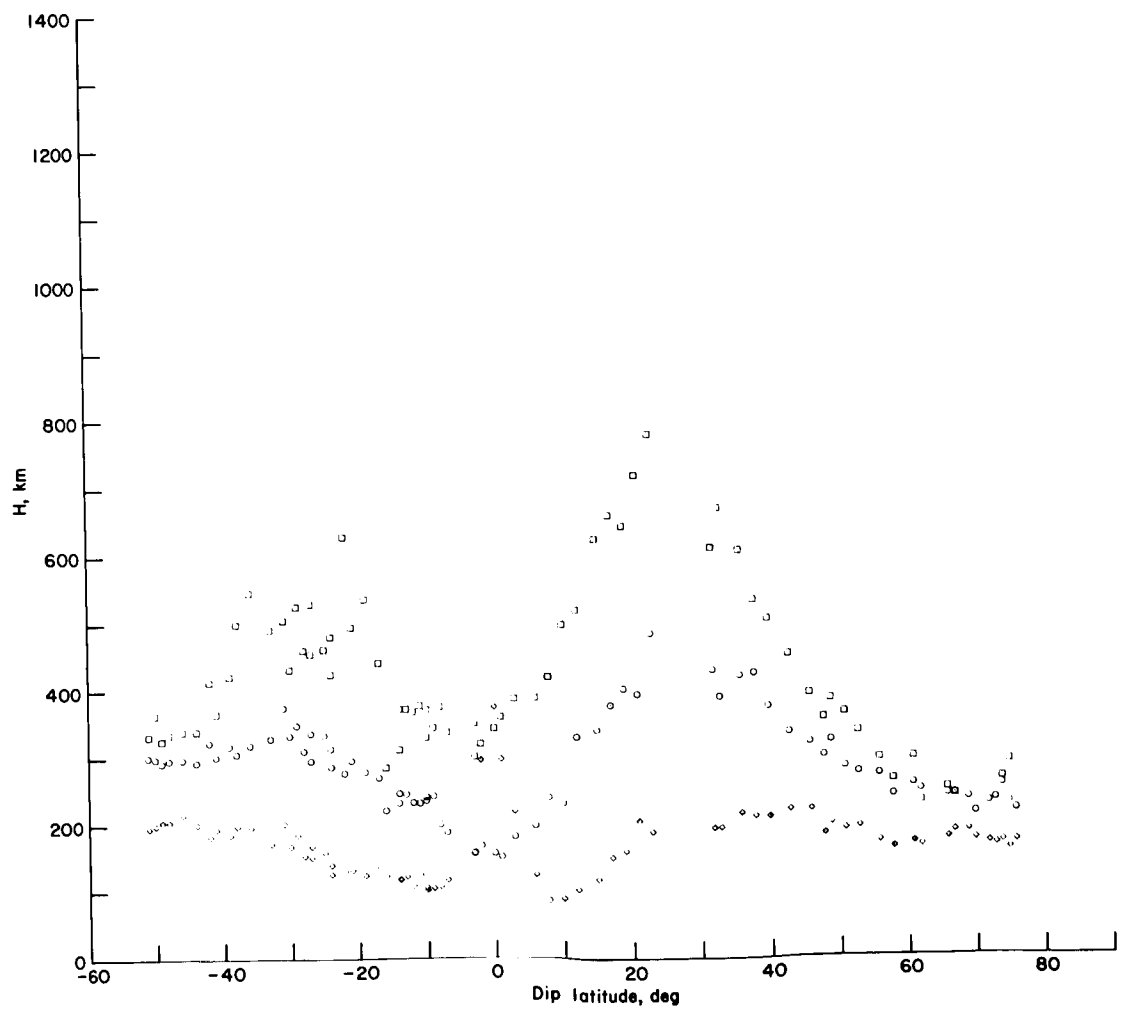

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 27

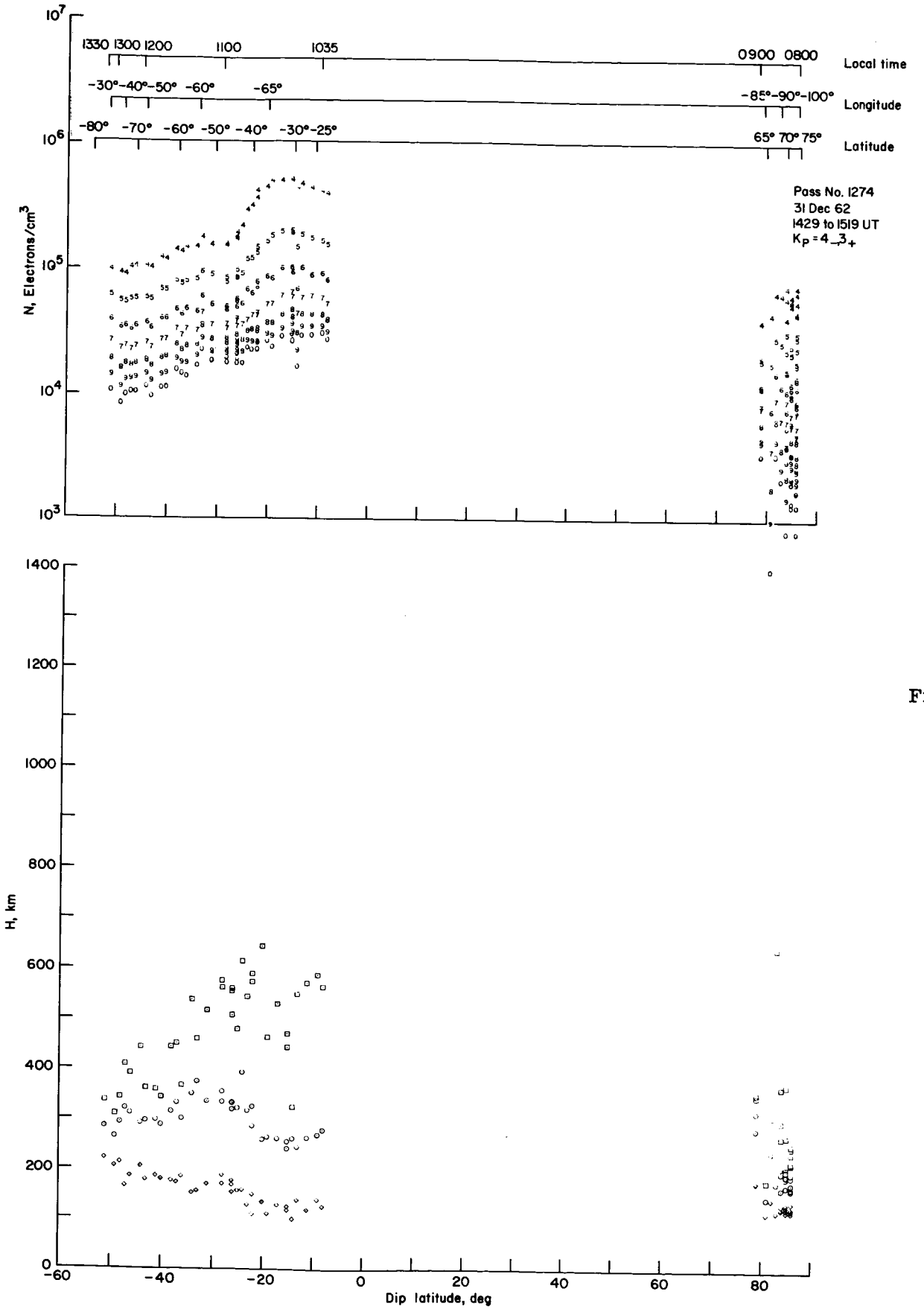

1330 1300 1200 1100 1035 0900 0800 Local time
-30°-40°-50° -60° -65° -85°-90°-100° Longitude
-80° -70° -60° -50° -40° -30°-25° 65° 70° 75° Latitude
Pass No. 1274
31 Dec 62
1429 to 1519 UT
$K_P = 4_-3_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 28

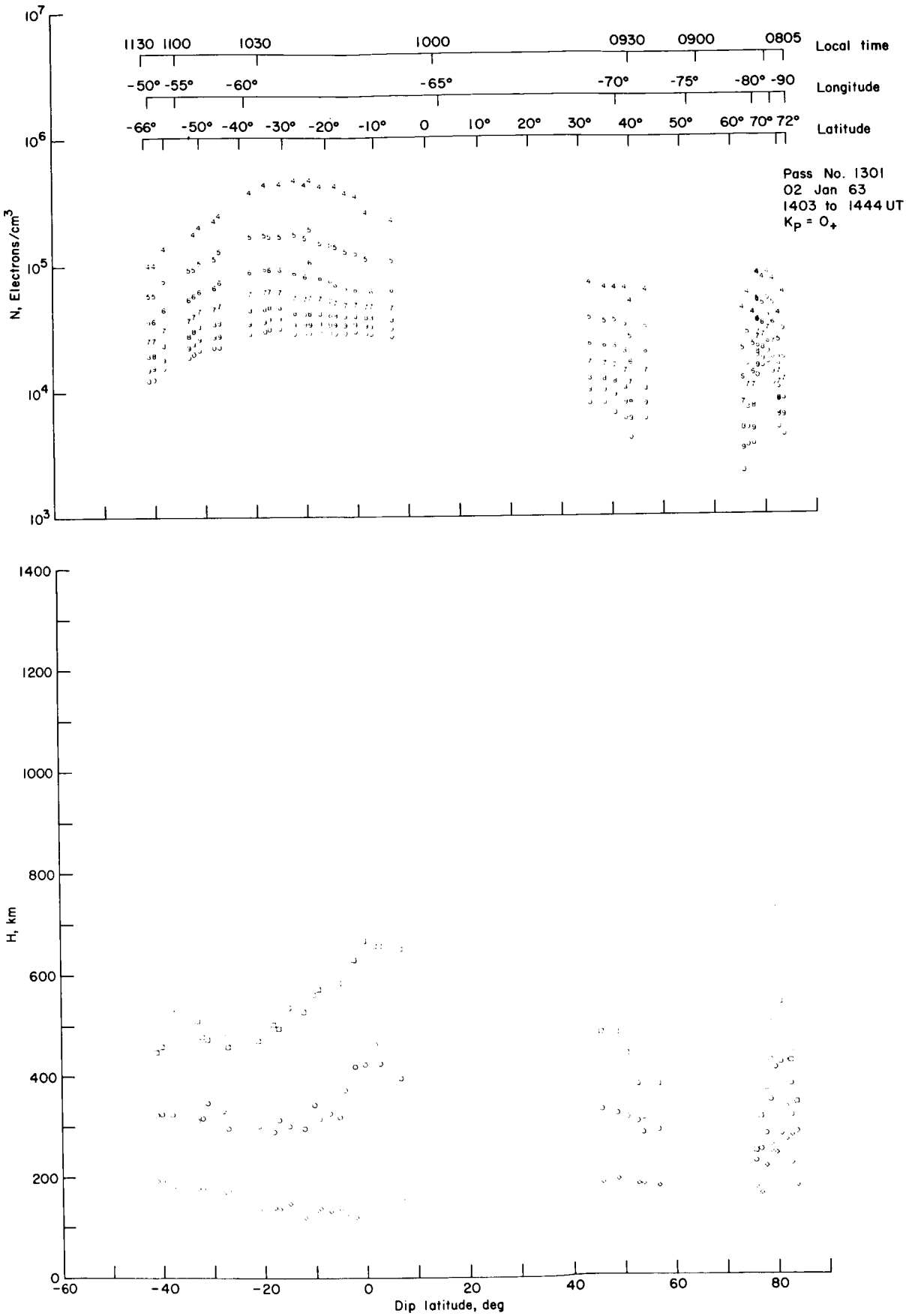
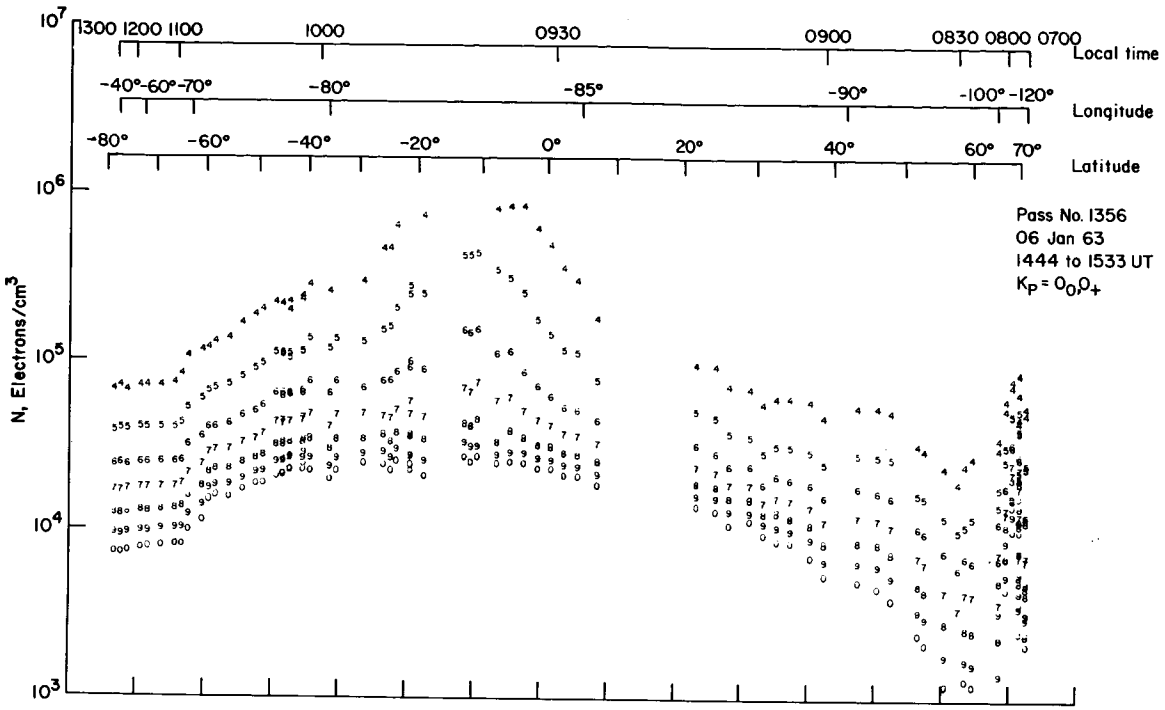

1130 1100 1030 1000 0930 0900 0805 Local time
-50° -55° -60° -65° -70° -75° -80° -90 Longitude
-66° -50° -40° -30° -20° -10° 0 10° 20° 30° 40° 50° 60° 70° 72° Latitude
Pass No. 1301
02 Jan 63
1403 to 1444 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 29


1300 1200 1100
1000
0930
0900
0830 0800 0700
Local time
-40°-60°-70°
-80°
-85°
-90°
-100°-120°
Longitude
-80°
-60°
-40°
-20°
0°
20°
40°
60°
70°
Latitude
Pass No. 1356
06 Jan 63
1444 to 1533 UT
$K_P = 0_0 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

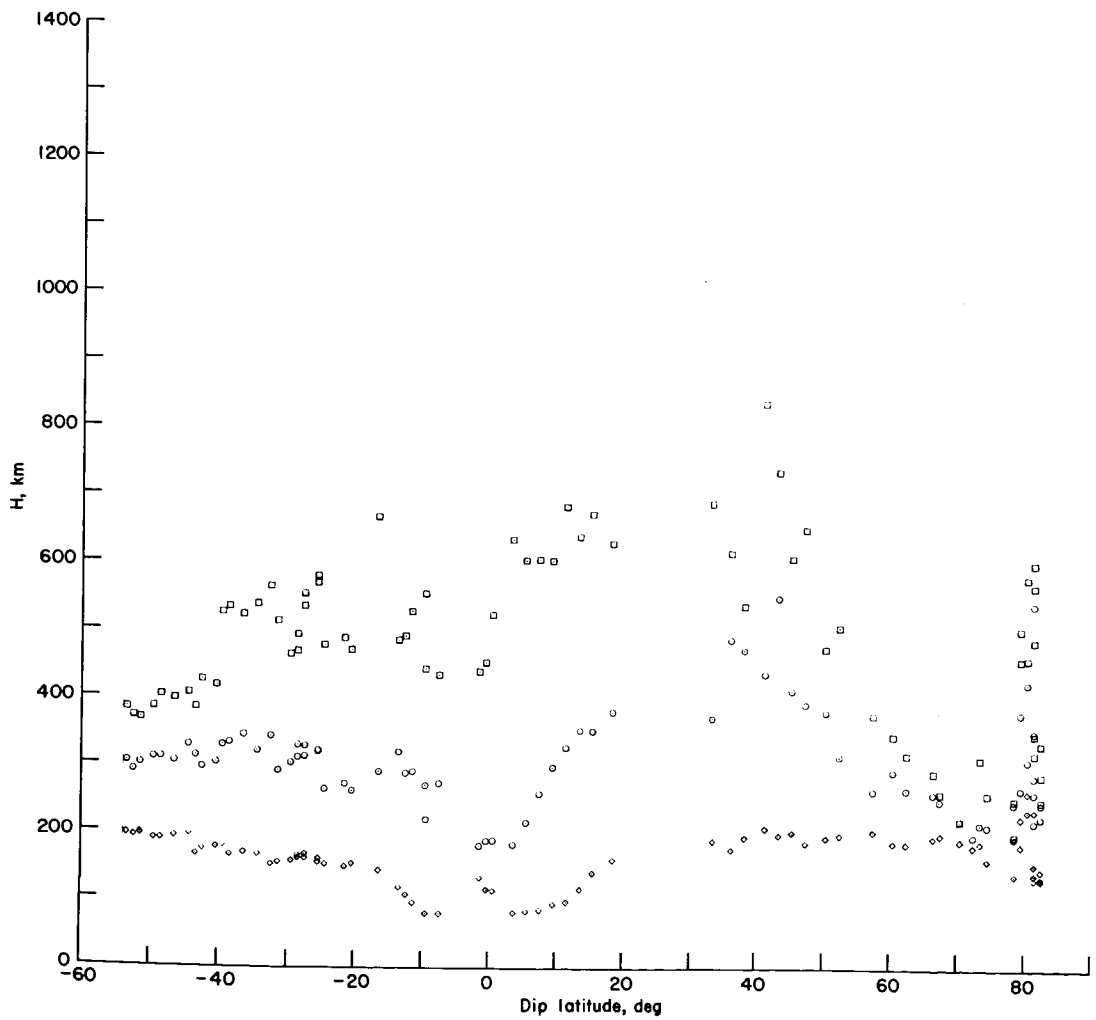

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 30

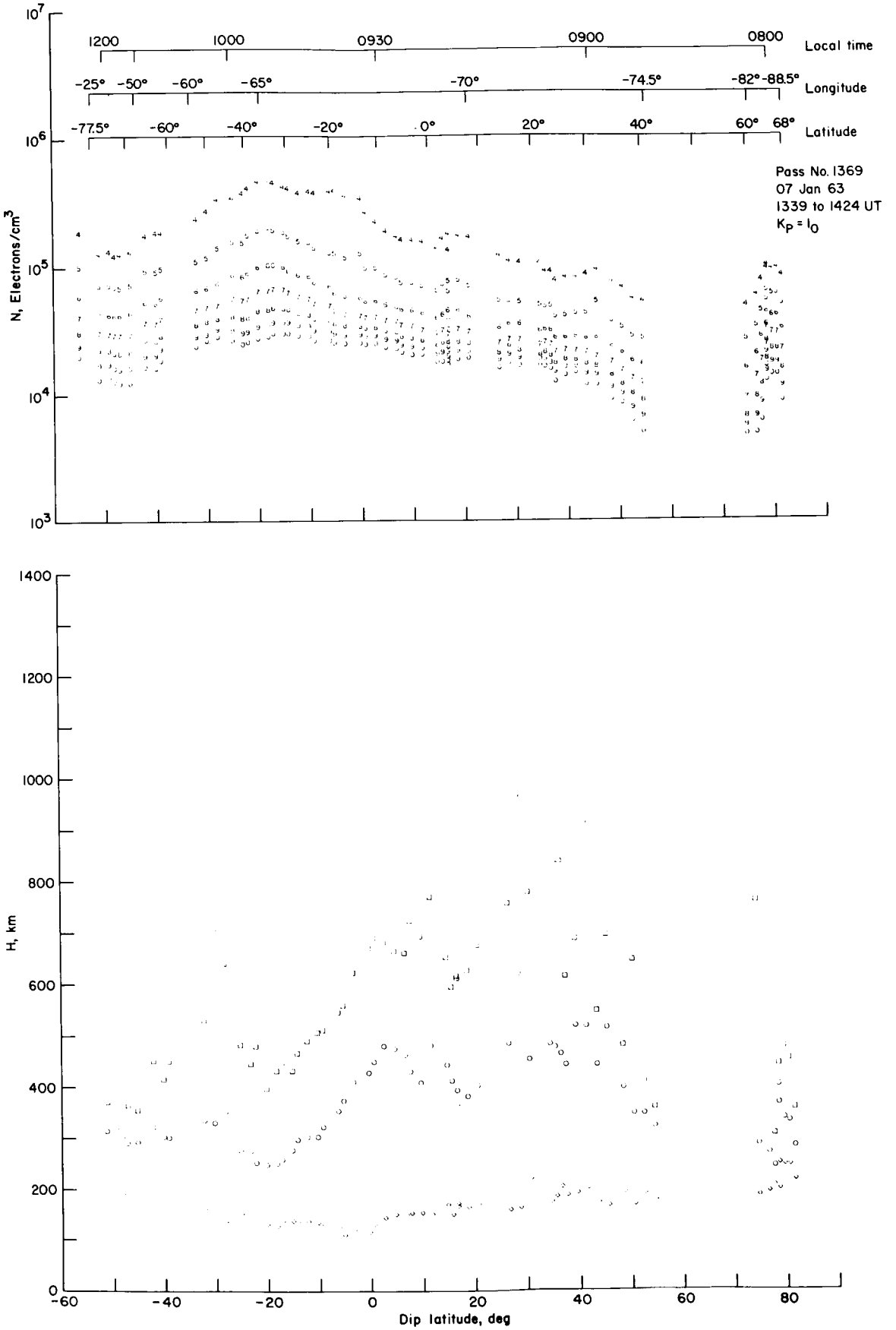

1200
1000
0930
0900
0800
Local time
-25° -50° -60° -65° -70° -74.5° -82°-88.5°
Longitude
-77.5° -60° -40° -20° 0° 20° 40° 60° 68°
Latitude
Pass No. 1369
07 Jan 63
1339 to 1424 UT
$K_p = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 31

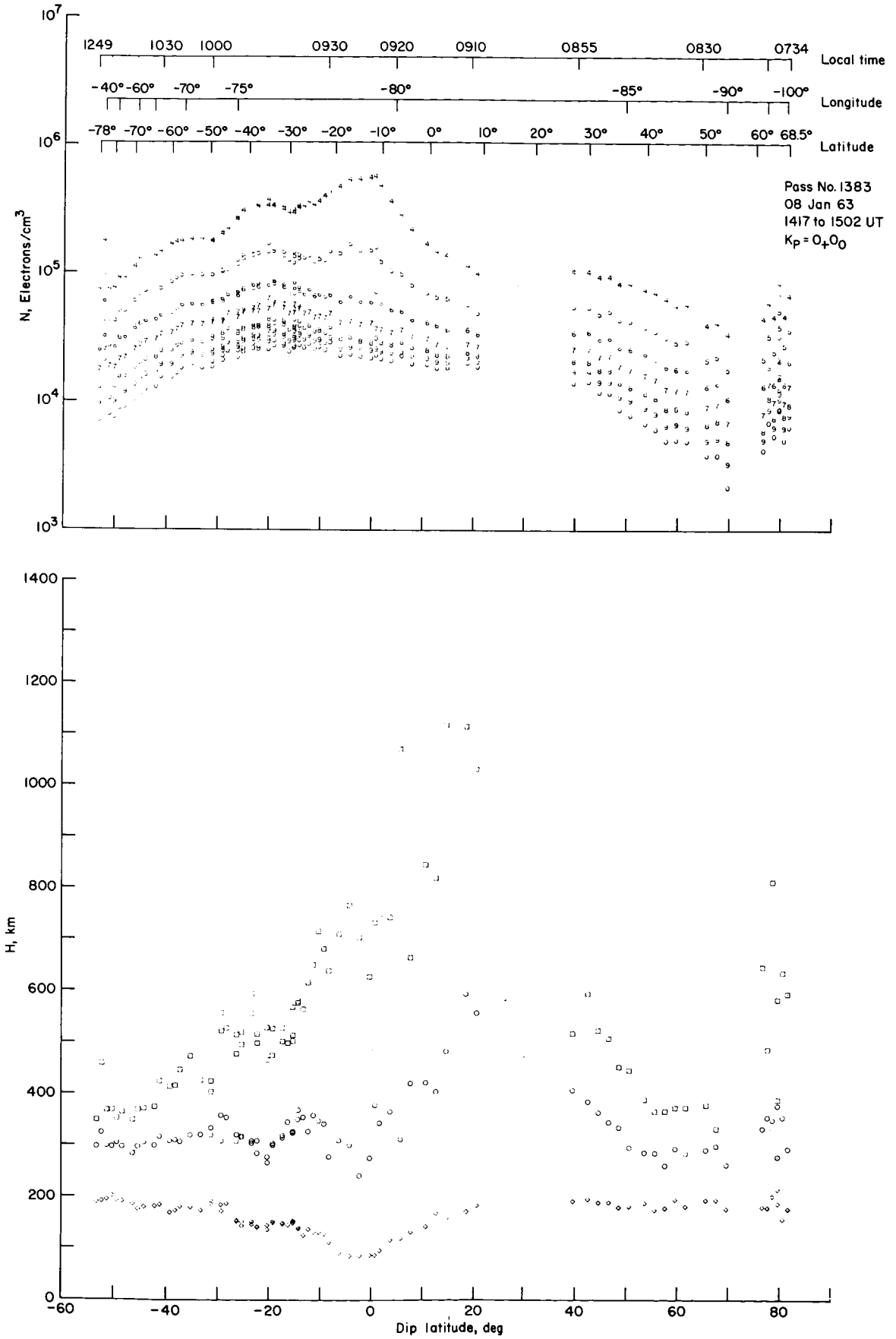
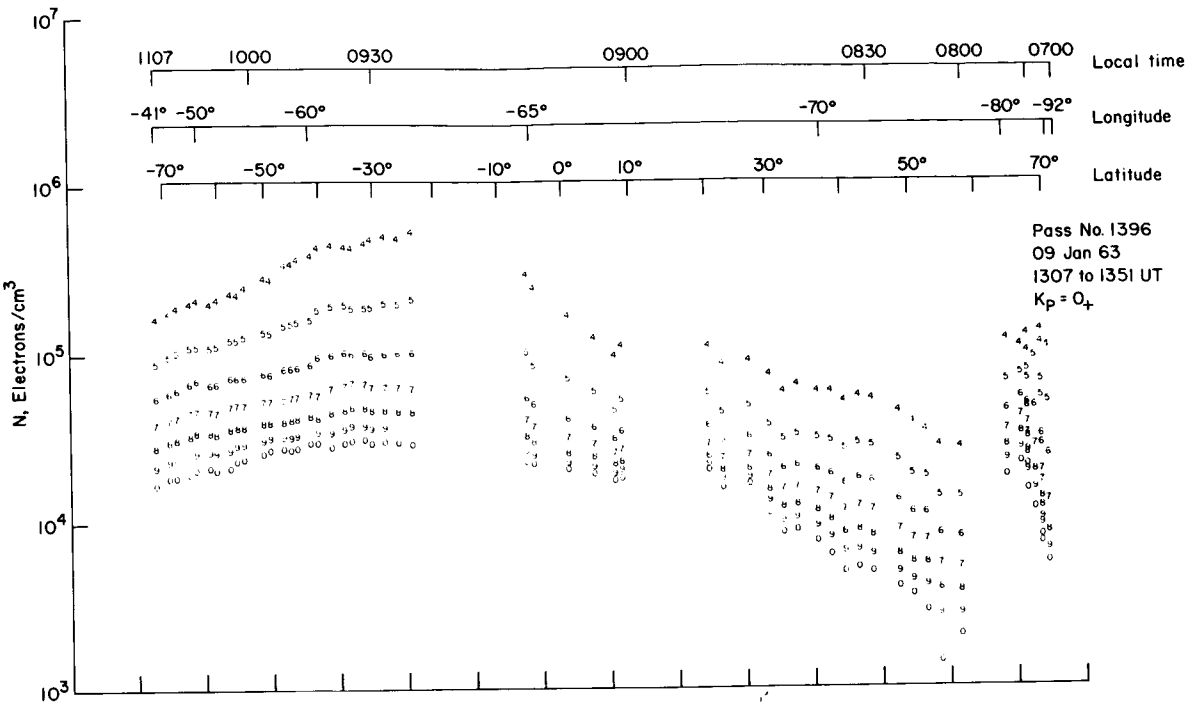

1249 1030 1000 0930 0920 0910 0855 0830 0734
Local time
-40° -60° -70° -75° -80° -85° -90° -100°
Longitude
-78° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 68.5°
Latitude
Pass No. 1383
08 Jan 63
1417 to 1502 UT
$K_P = 0_+0_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 32


1107
1000
0930
0900
0830
0800
0700
Local time
-41° -50°
-60°
-65°
-70°
-80° -92°
Longitude
-70°
-50°
-30°
-10°
0°
10°
30°
50°
70°
Latitude
Pass No. 1396
09 Jan 63
1307 to 1351 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

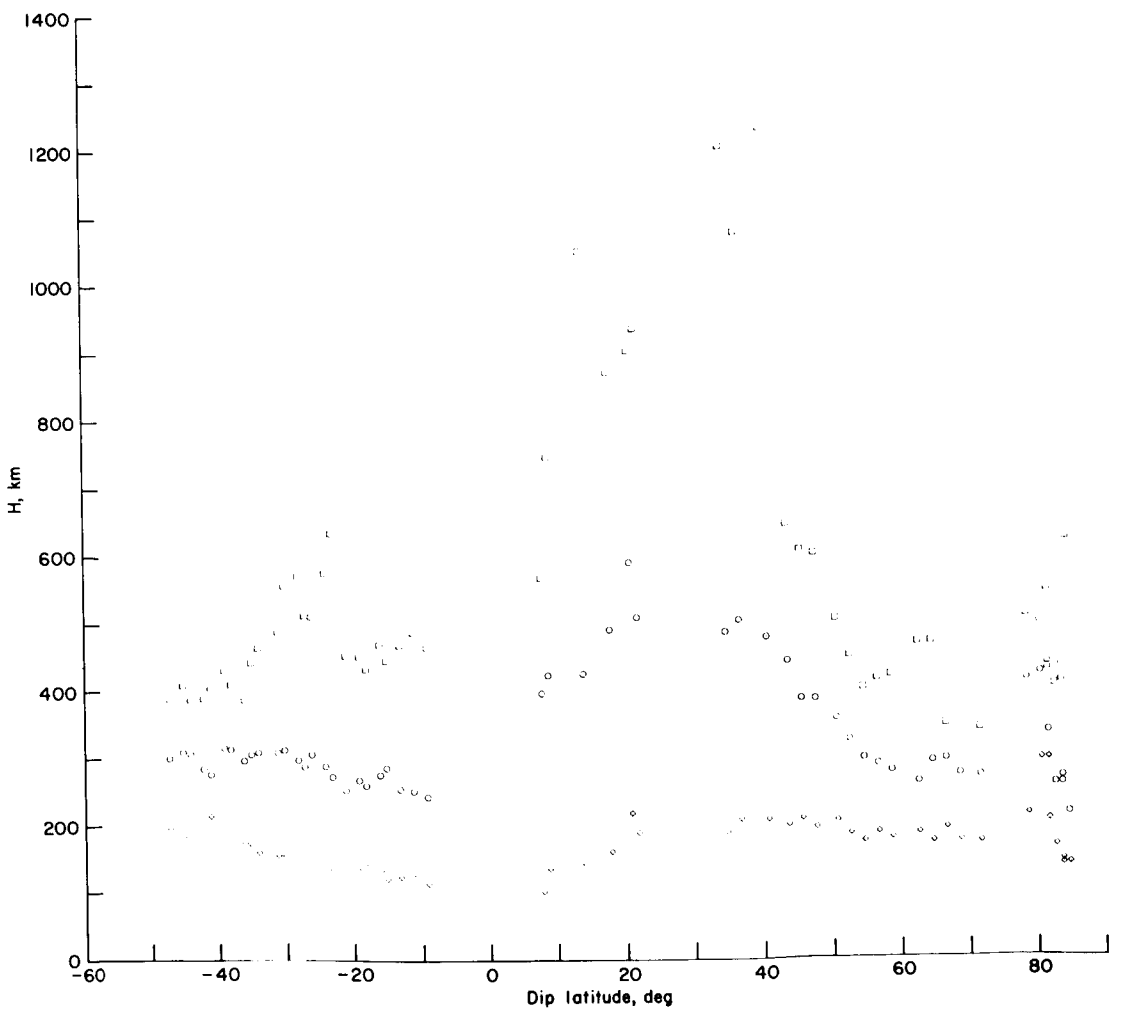

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 33

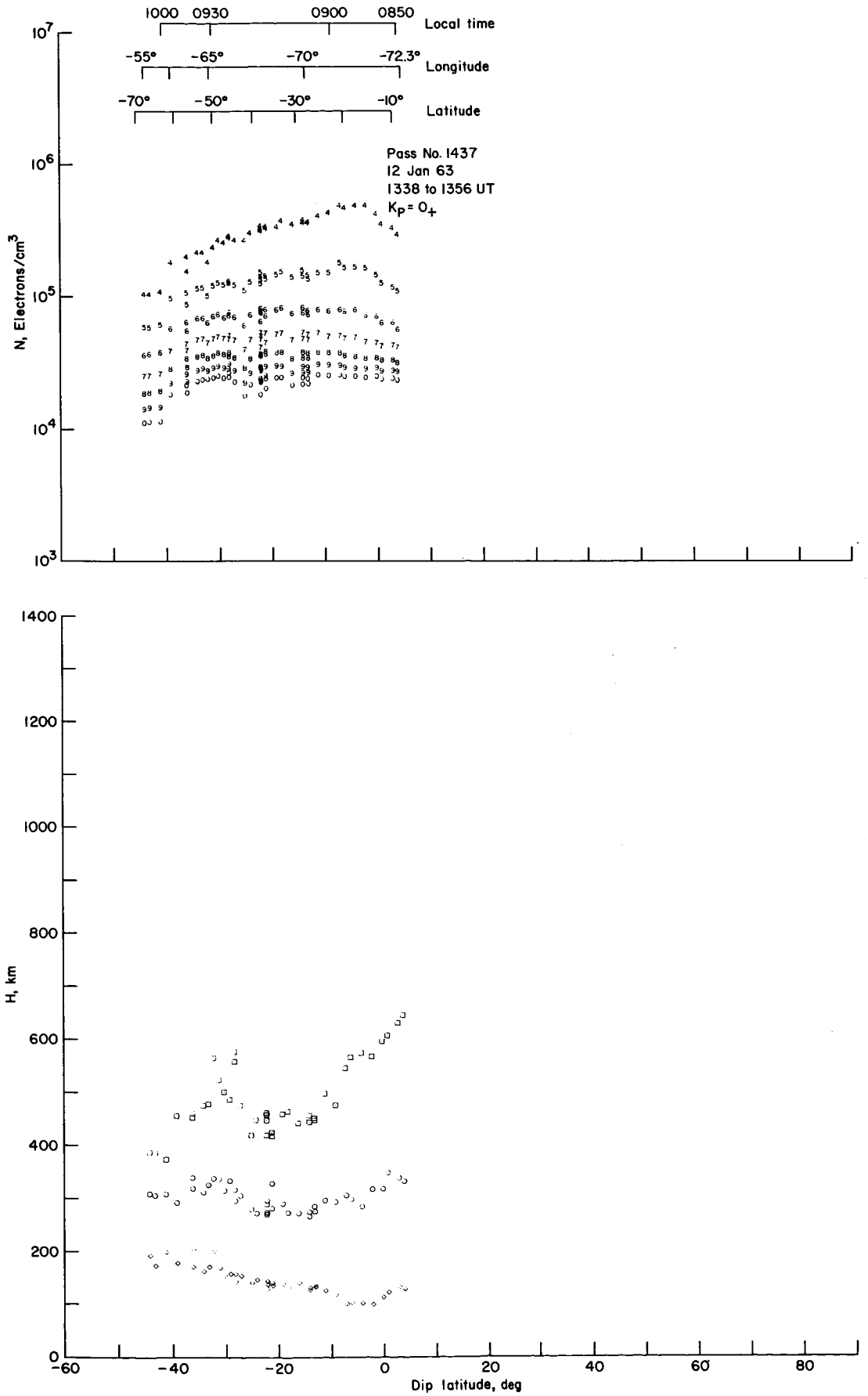

1000 0930 0900 0850
Local time
-55° -65° -70° -72.3°
Longitude
-70° -50° -30° -10°
Latitude
Pass No. 1437
12 Jan 63
1338 to 1356 UT
$K_p = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 34

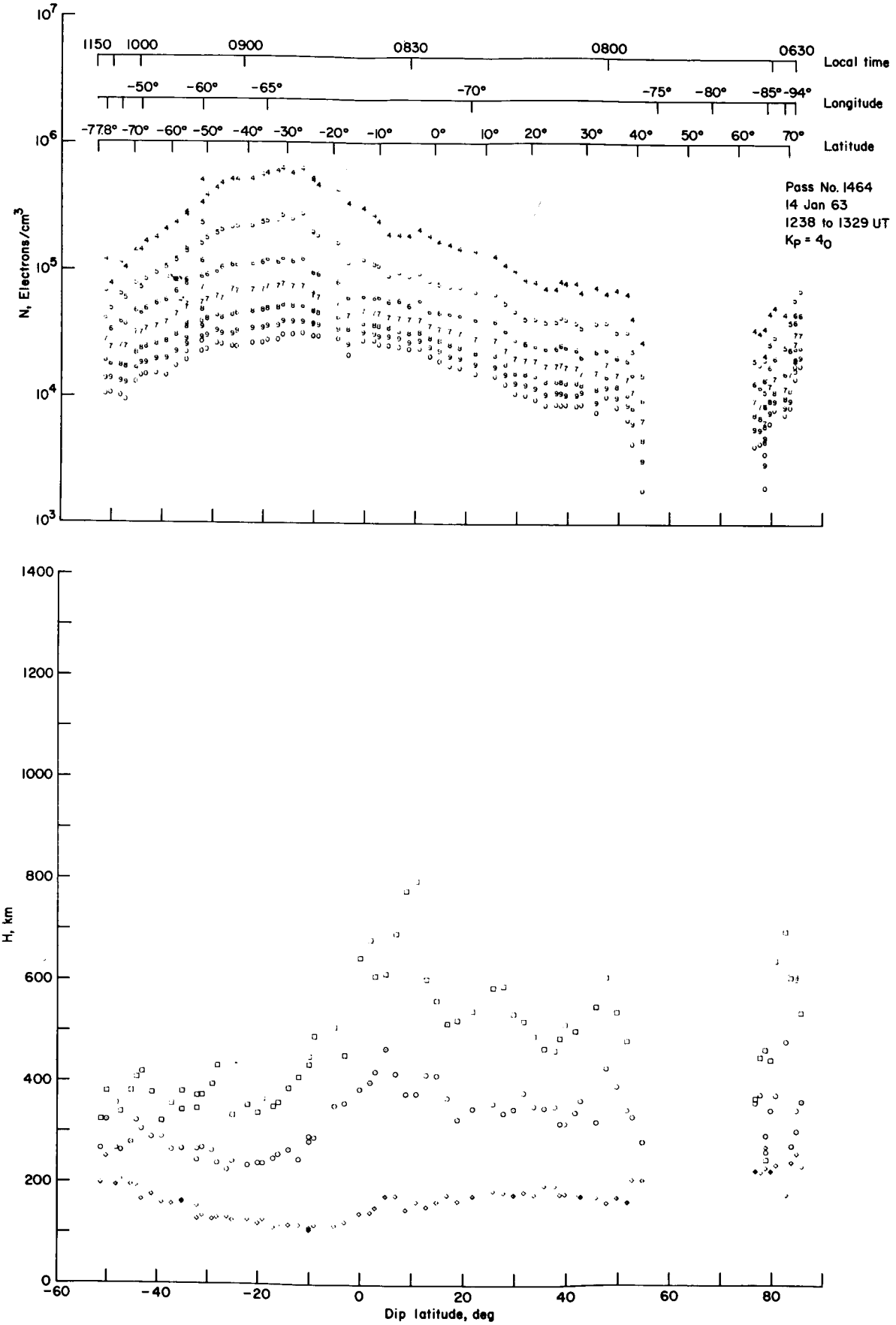

Local time
1150 1000 0900 0830 0800 0630
Longitude
-50° -60° -65° -70° -75° -80° -85° -94°
Latitude
-77.8° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 70°
Pass No. 1464
14 Jan 63
1238 to 1329 UT
Kp = 4o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 35

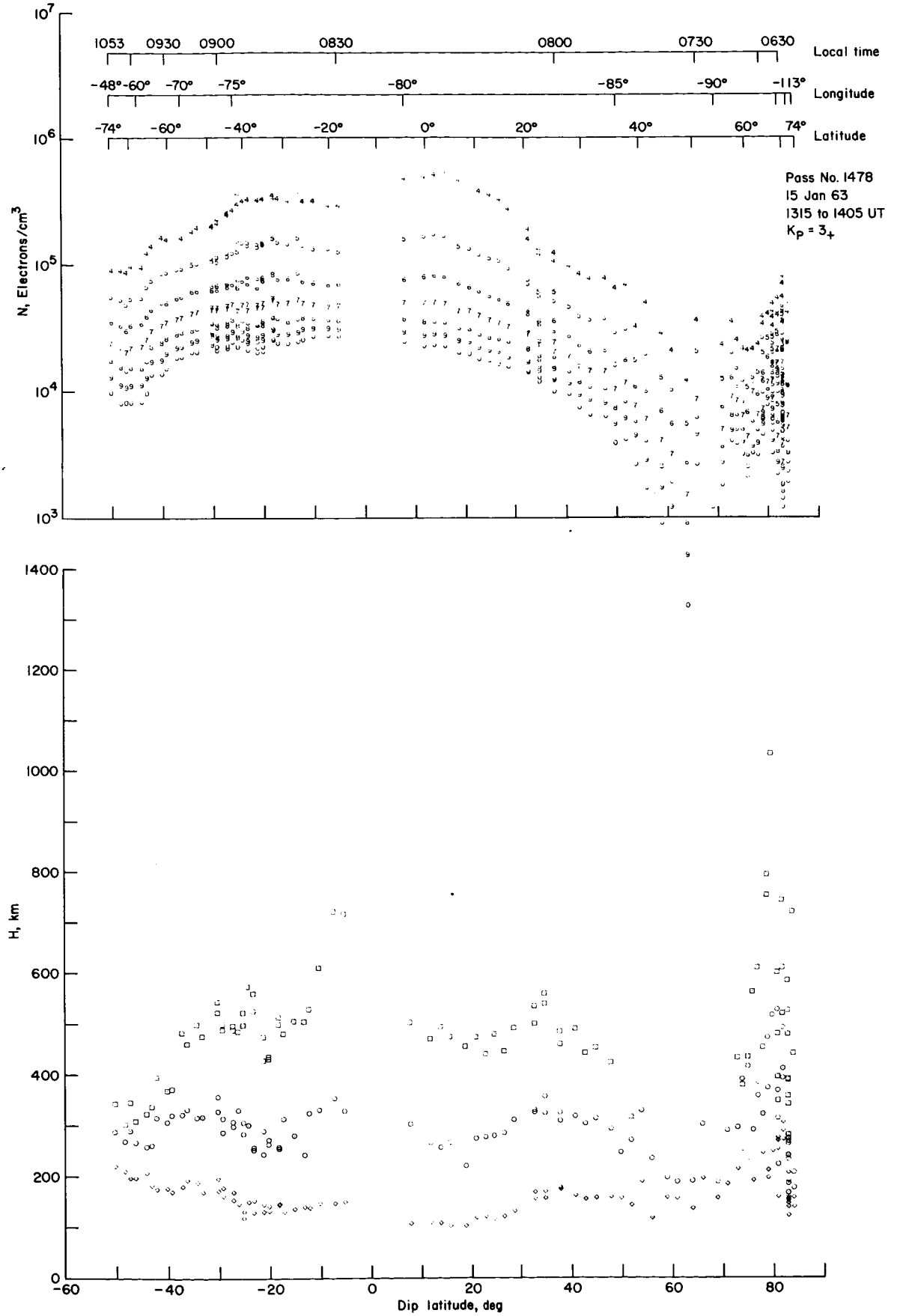

1053 0930 0900 0830 0800 0730 0630
Local time
-48° -60° -70° -75° -80° -85° -90° -113°
Longitude
-74° -60° -40° -20° 0° 20° 40° 60° 74°
Latitude
Pass No. 1478
15 Jan 63
1315 to 1405 UT
$K_P = 3_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 36

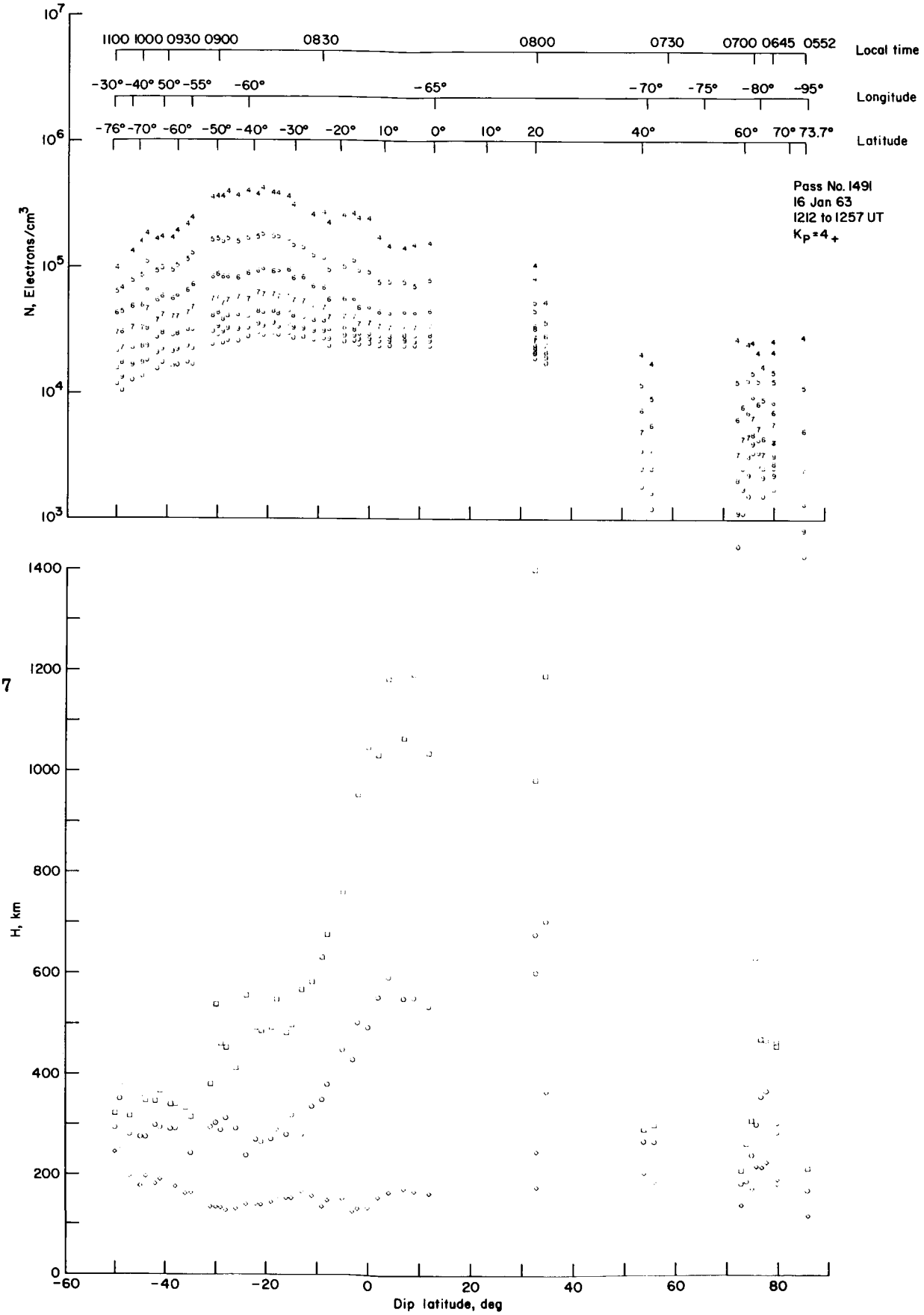

1100 1000 0930 0900
0830
0800
0730
0700 0645 0552
Local time
-30° -40° 50° -55°
-60°
-65°
-70°
-75°
-80°
-95°
Longitude
-76° -70° -60° -50° -40° -30° -20° 10° 0° 10° 20 40° 60° 70° 73.7°
Latitude
Pass No. 1491
16 Jan 63
1212 to 1257 UT
$K_P = 4_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 37

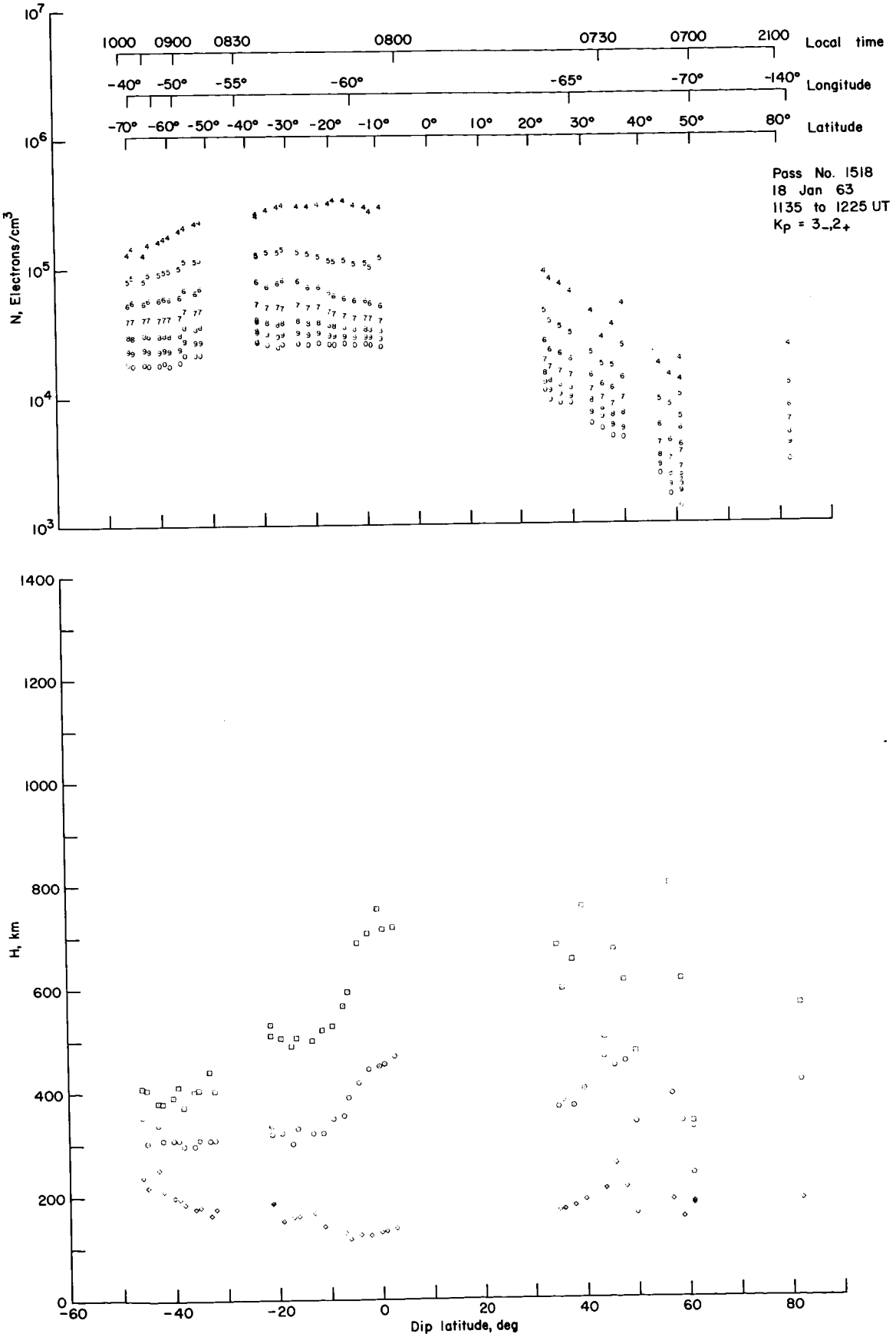

1000 0900 0830 0800 0730 0700 2100 Local time
-40° -50° -55° -60° -65° -70° -140° Longitude
-70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 80° Latitude
Pass No. 1518
18 Jan 63
1135 to 1225 UT
K_P = 3-,2+
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 38

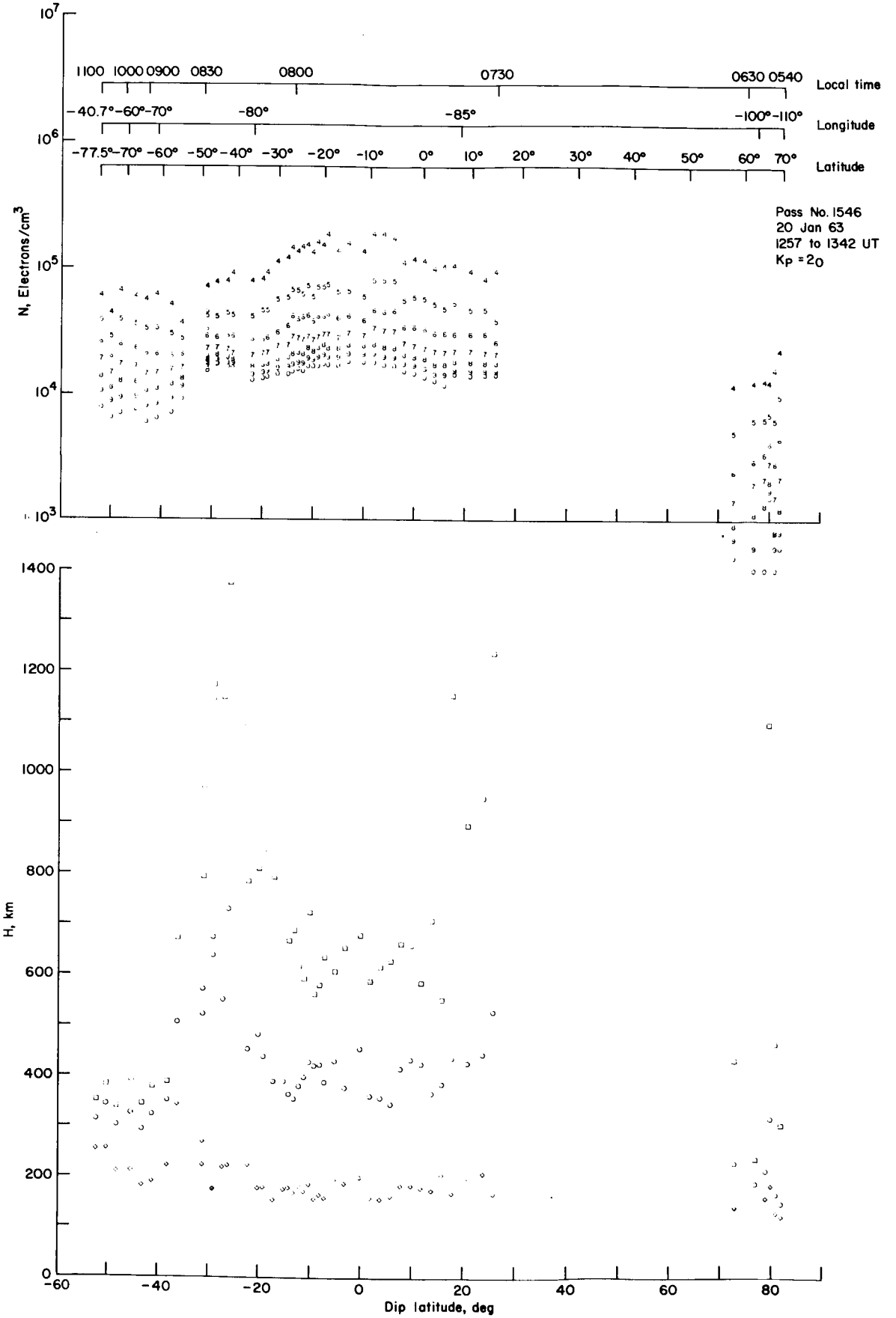

1100 1000 0900 0830 0800 0730 0630 0540
Local time
-40.7°-60°-70° -80° -85° -100°-110°
Longitude
-77.5°-70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 70°
Latitude
Pass No. 1546
20 Jan 63
1257 to 1342 UT
Kp = 2o
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 39

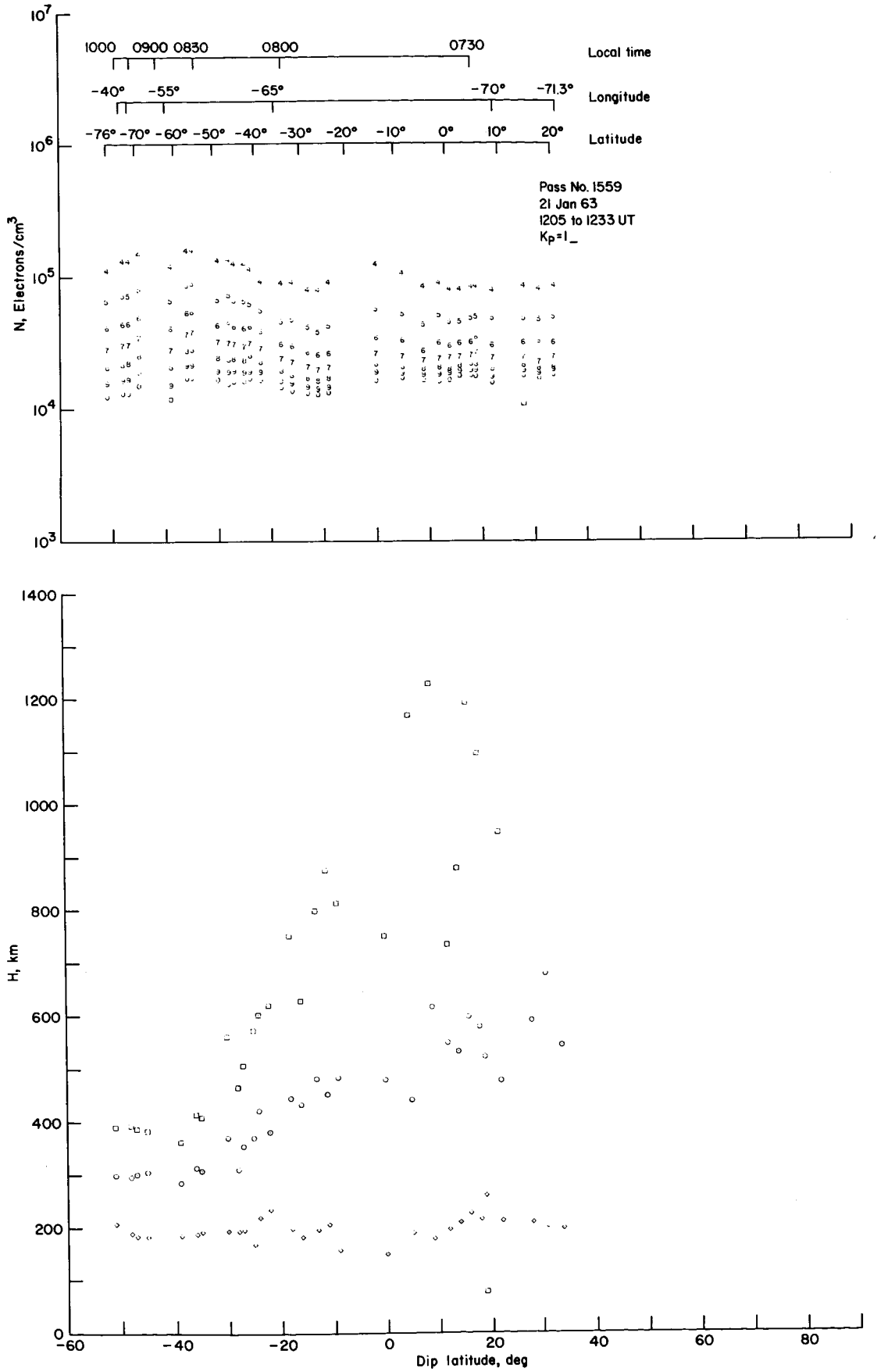

10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1000 0900 0830 0800 0730
Local time
-40° -55° -65° -70° -71.3°
Longitude
-76° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20°
Latitude
Pass No. 1559
21 Jan 63
1205 to 1233 UT
Kp=1_
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 40

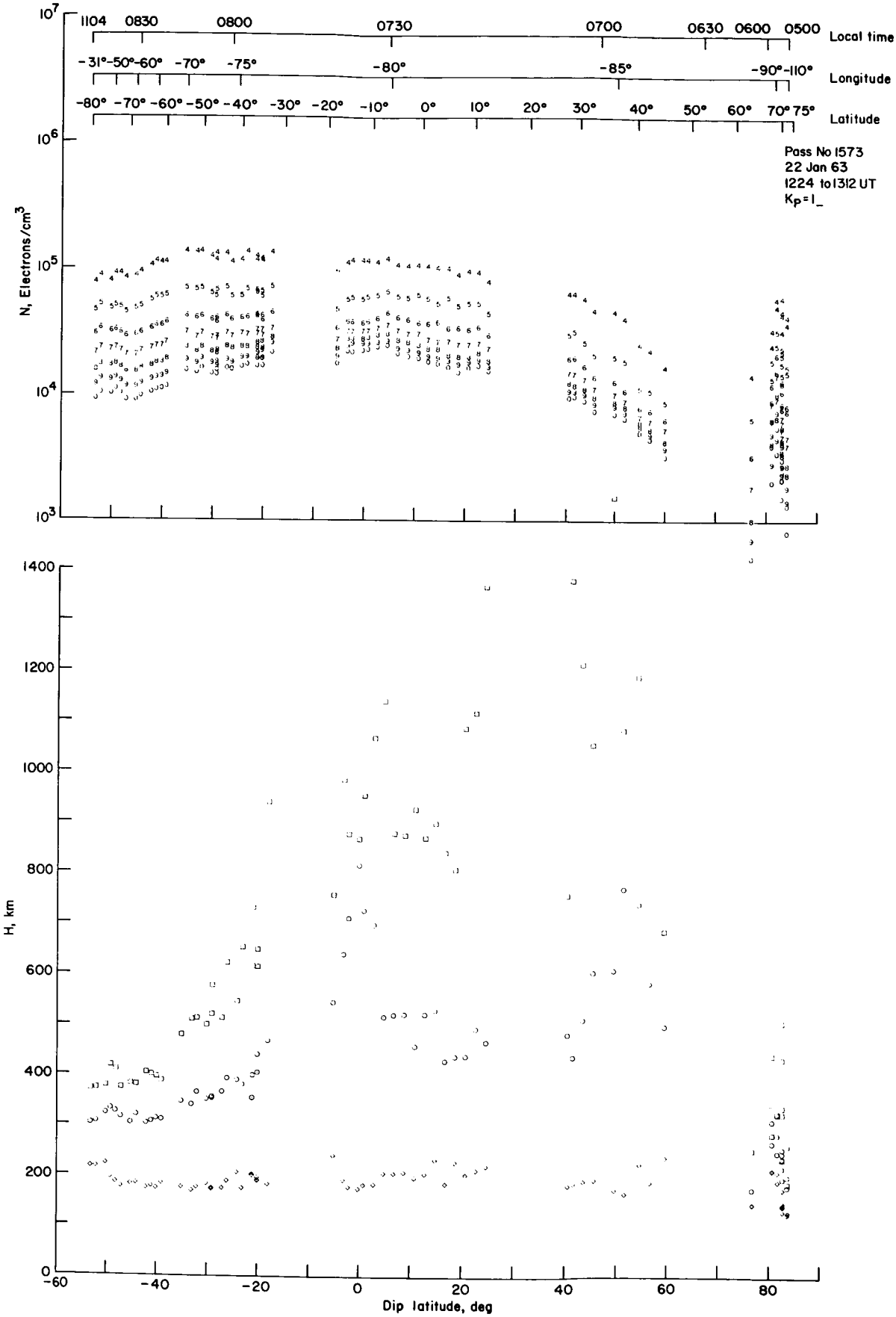

1104 0830 0800 0730 0700 0630 0600 0500
Local time
-31°-50°-60° -70° -75° -80° -85° -90°-110°
Longitude
-80° -70° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 70° 75°
Latitude
Pass No 1573
22 Jan 63
1224 to 1312 UT
Kp = 1_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 41

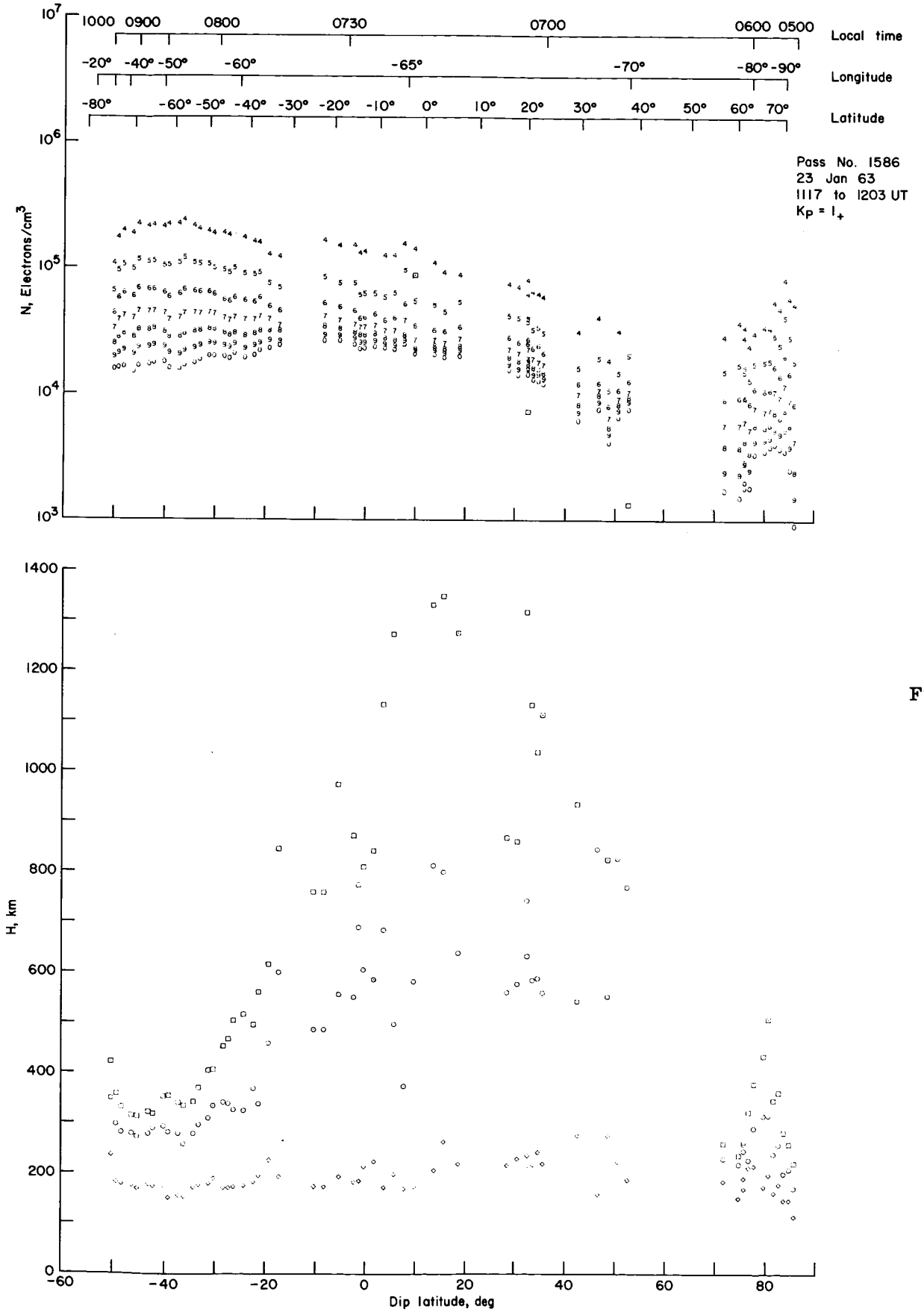

1000 0900 0800 0730 0700 0600 0500
Local time
-20° -40° -50° -60° -65° -70° -80° -90°
Longitude
-80° -60° -50° -40° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 70°
Latitude
Pass No. 1586
23 Jan 63
1117 to 1203 UT
Kp = 1+
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 42

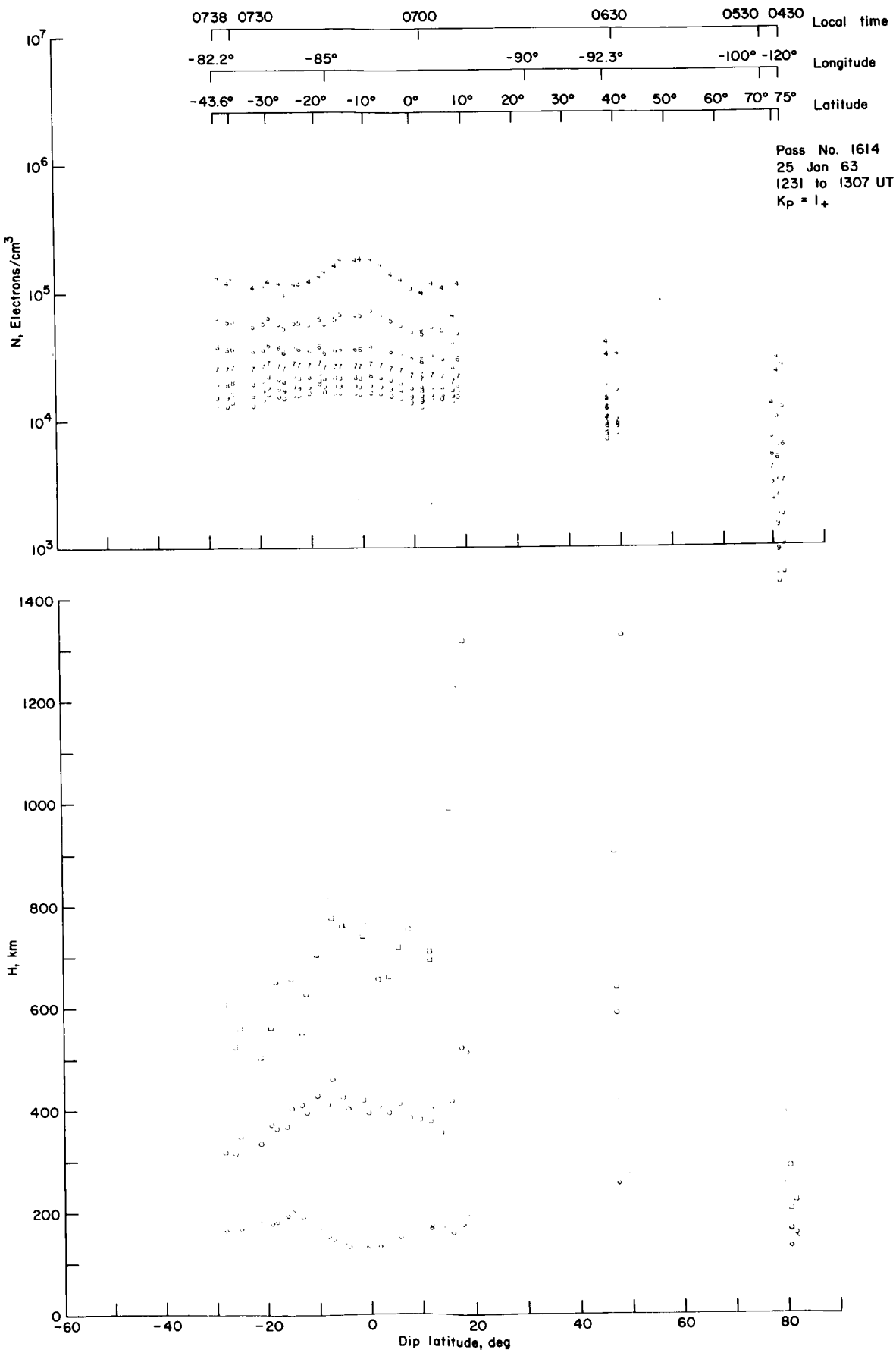

0738 0730
0700
0630
0530 0430
Local time
-82.2°
-85°
-90°
-92.3°
-100° -120°
Longitude
-43.6° -30° -20° -10° 0° 10° 20° 30° 40° 50° 60° 70° 75°
Latitude
Pass No. 1614
25 Jan 63
1231 to 1307 UT
Kp = 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 43

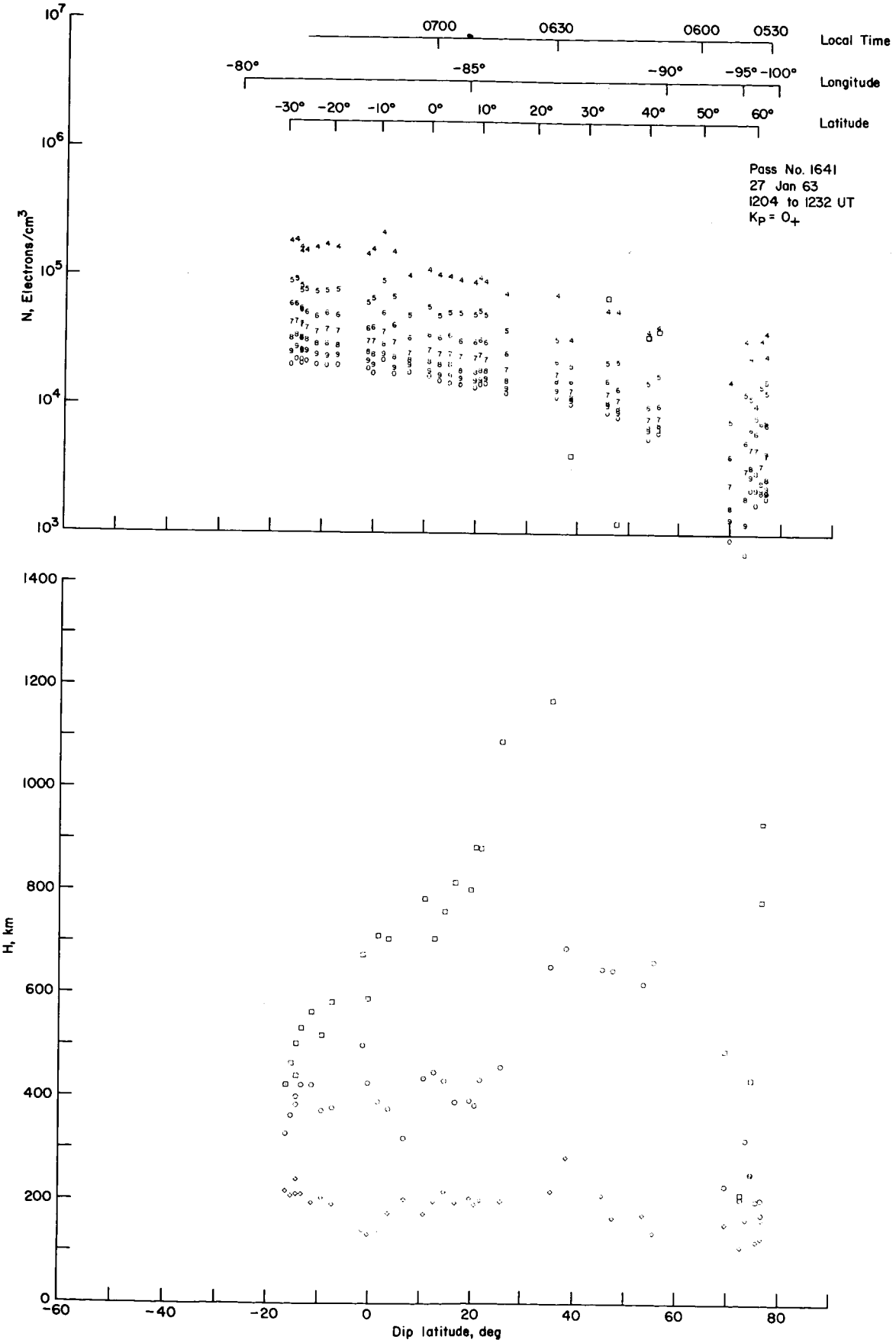

0700
0630
0600
0530
Local Time
-80°
-85°
-90°
-95°
-100°
Longitude
-30°
-20°
-10°
0°
10°
20°
30°
40°
50°
60°
Latitude
Pass No. 1641
27 Jan 63
1204 to 1232 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 44

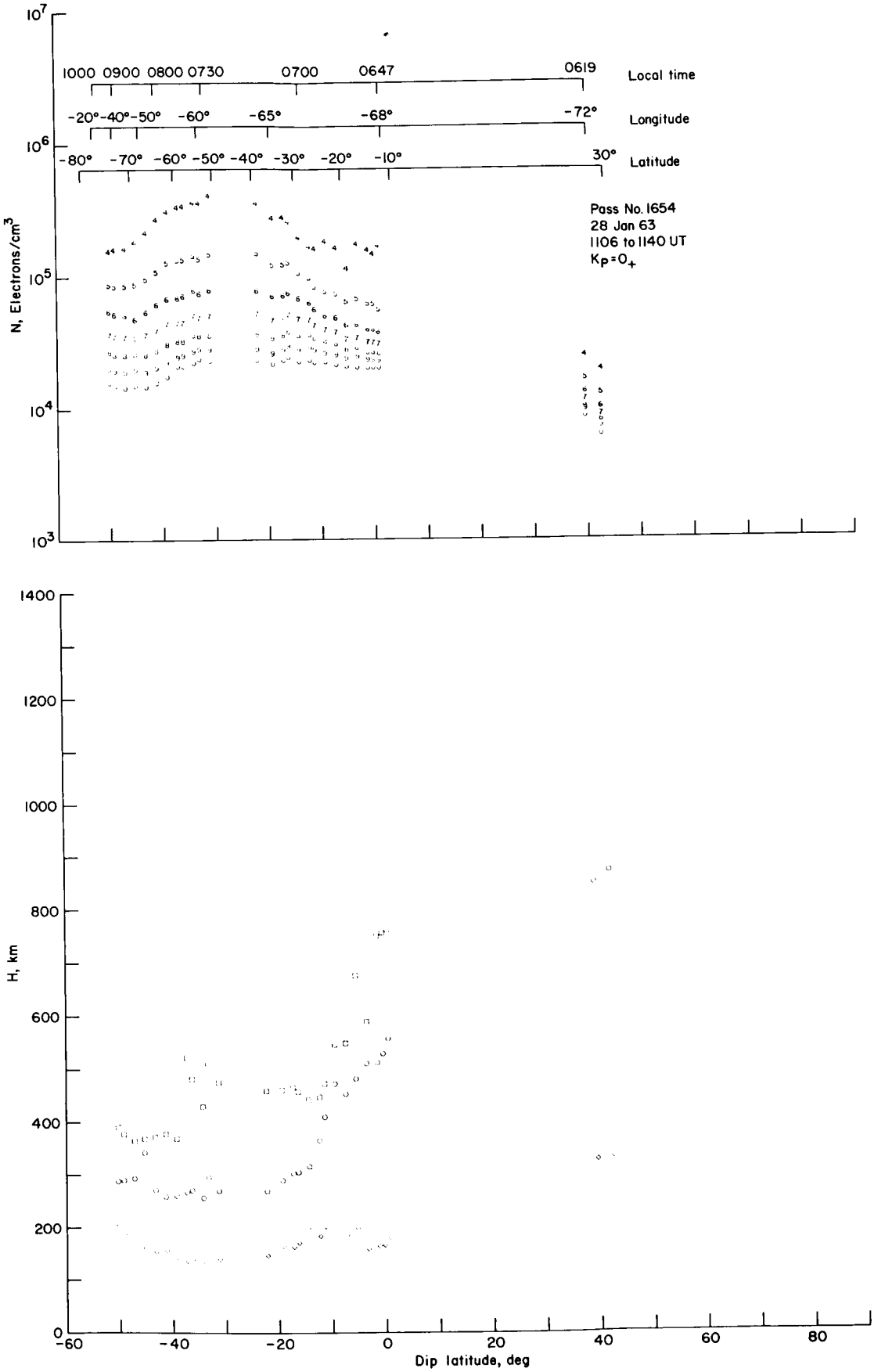

1000 0900 0800 0730 0700 0647 0619
Local time
-20° -40° -50° -60° -65° -68° -72°
Longitude
-80° -70° -60° -50° -40° -30° -20° -10° 30°
Latitude
Pass No. 1654
28 Jan 63
1106 to 1140 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 45

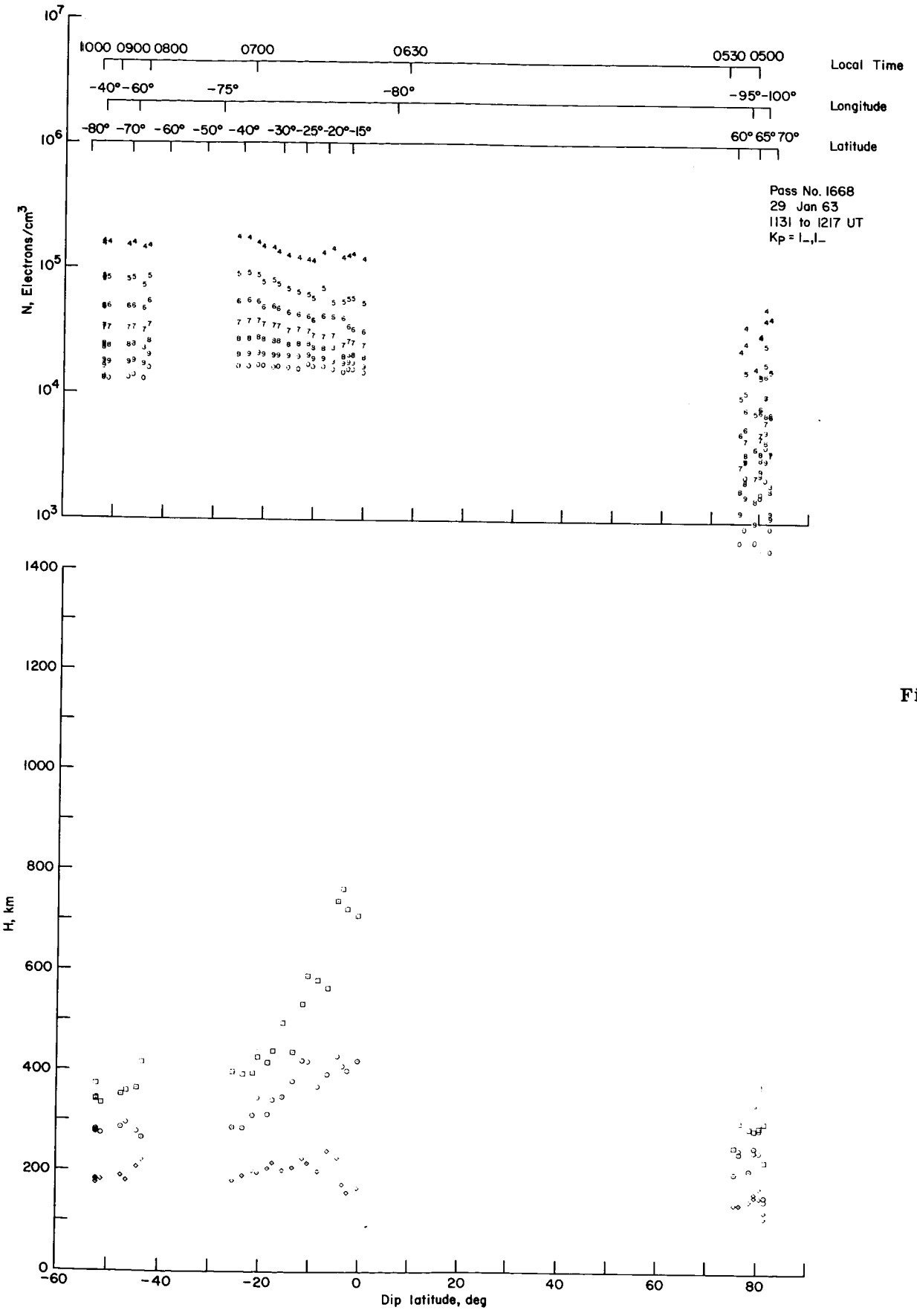

1000 0900 0800
0700
0630
0530 0500
Local Time
-40°-60°
-75°
-80°
-95°-100°
Longitude
-80° -70° -60° -50° -40° -30°-25°-20°-15°
60° 65° 70°
Latitude
Pass No. 1668
29 Jan 63
1131 to 1217 UT
KP = 1-,1-
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 46

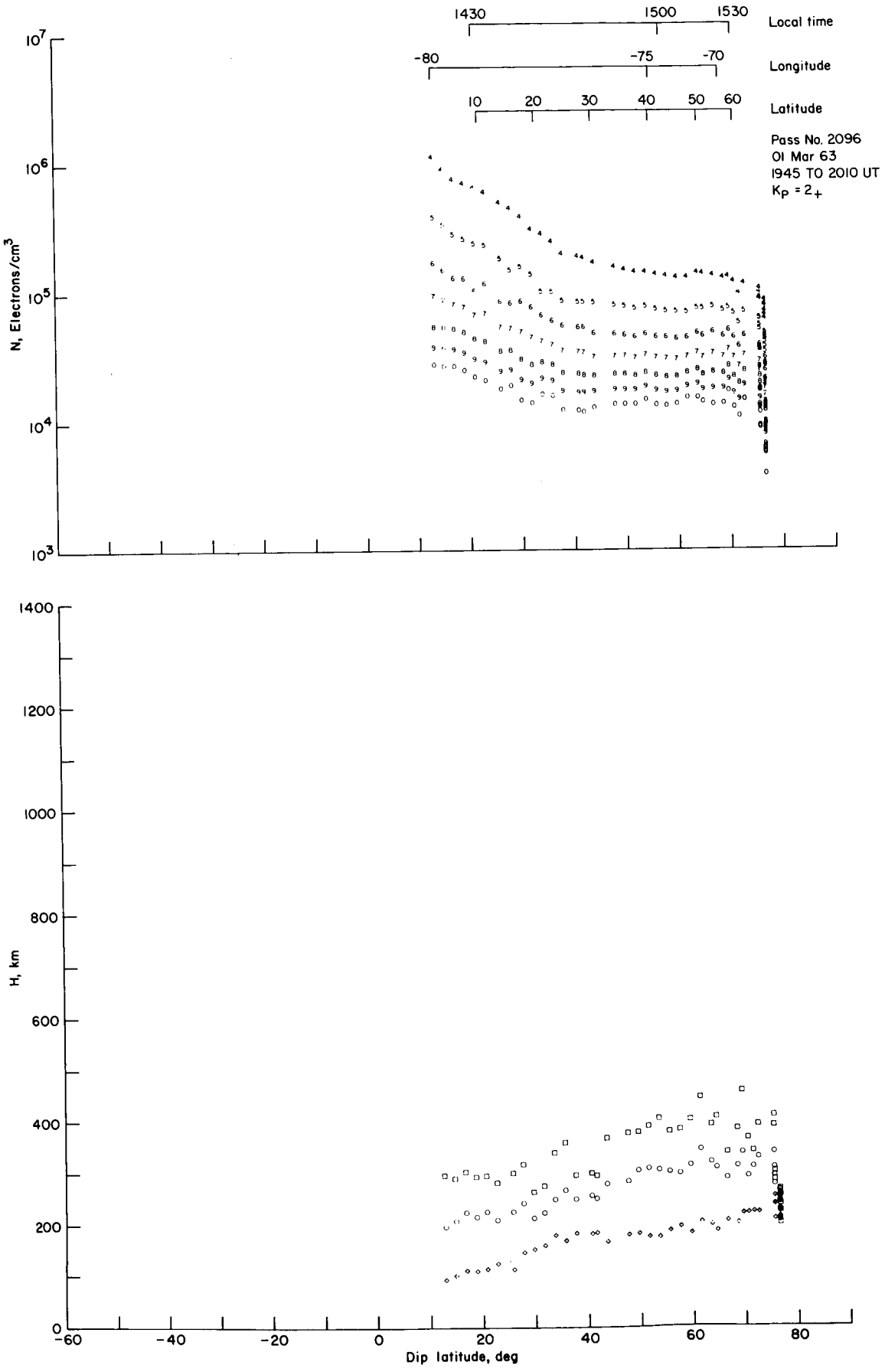

1430
1500
1530
Local time
-80
-75
-70
Longitude
10
20
30
40
50
60
Latitude
Pass No. 2096
01 Mar 63
1945 TO 2010 UT
$K_P = 2_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 47

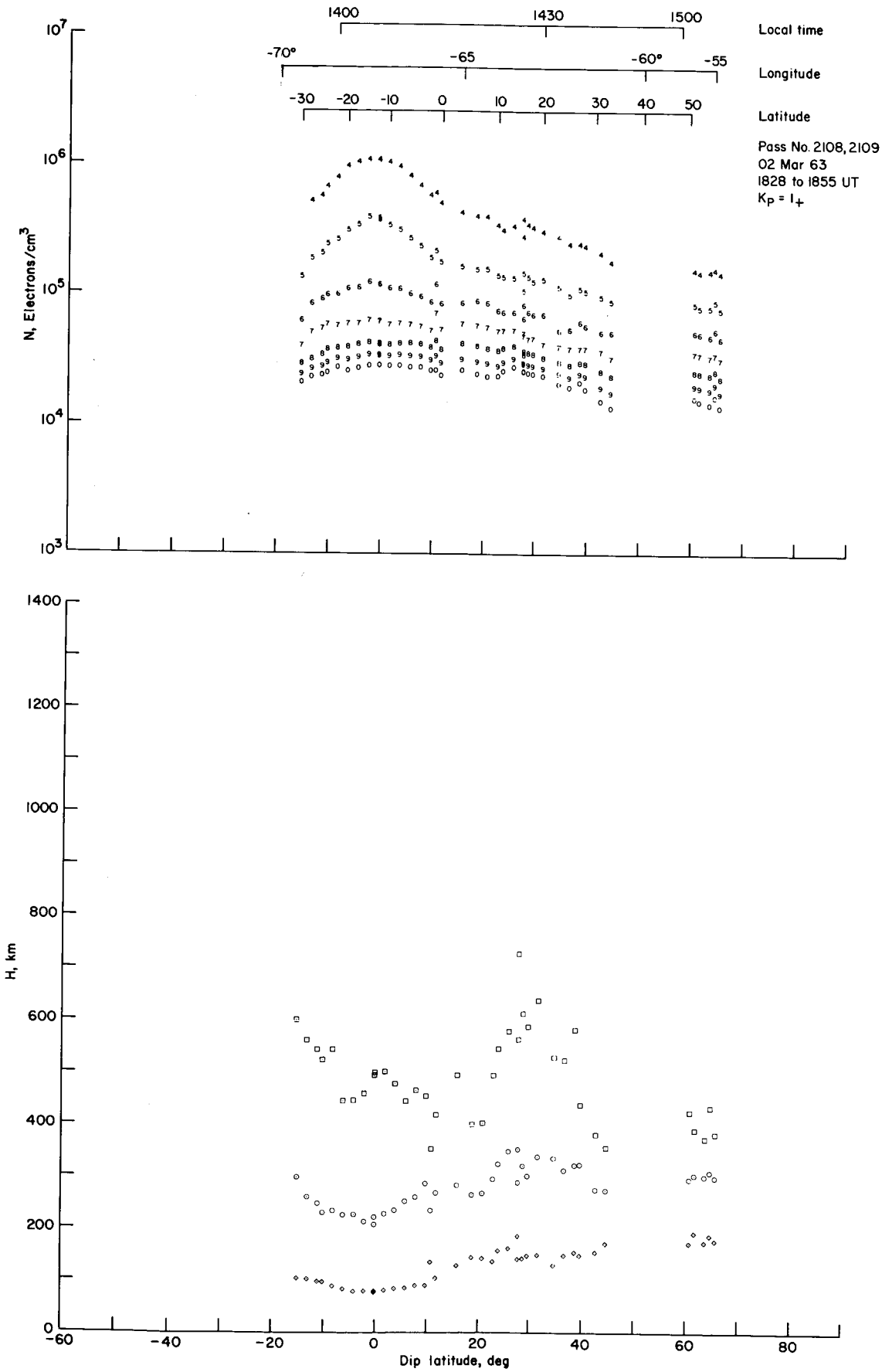

1400
1430
1500
Local time
-70°
-65
-60°
-55
Longitude
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 2108, 2109
02 Mar 63
1828 to 1855 UT
$K_P = 1_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 48

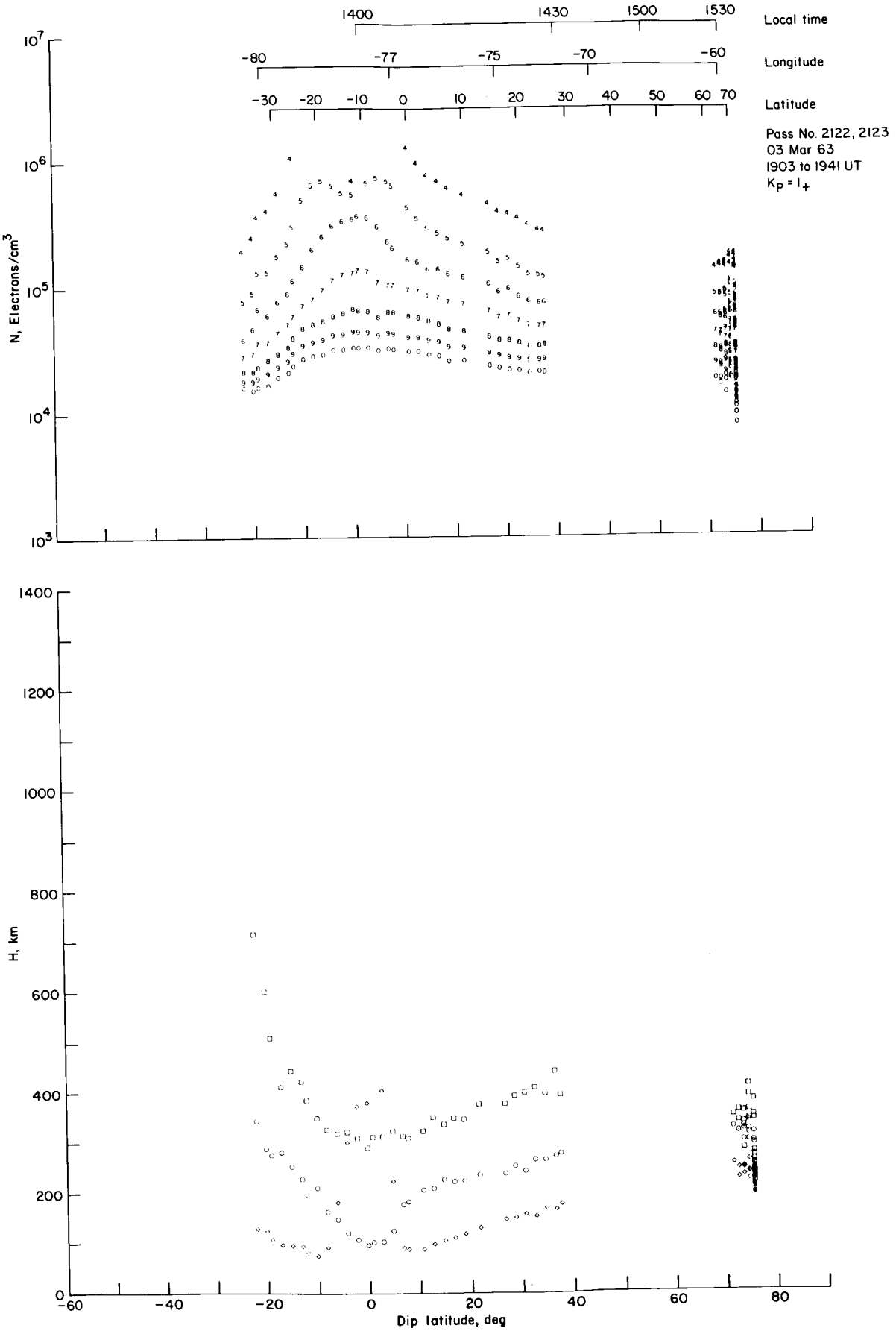

1400
1430
1500
1530
Local time
-80
-77
-75
-70
-60
Longitude
-30
-20
-10
0
10
20
30
40
50
60
70
Latitude
Pass No. 2122, 2123
03 Mar 63
1903 to 1941 UT
$K_P = 1_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 49

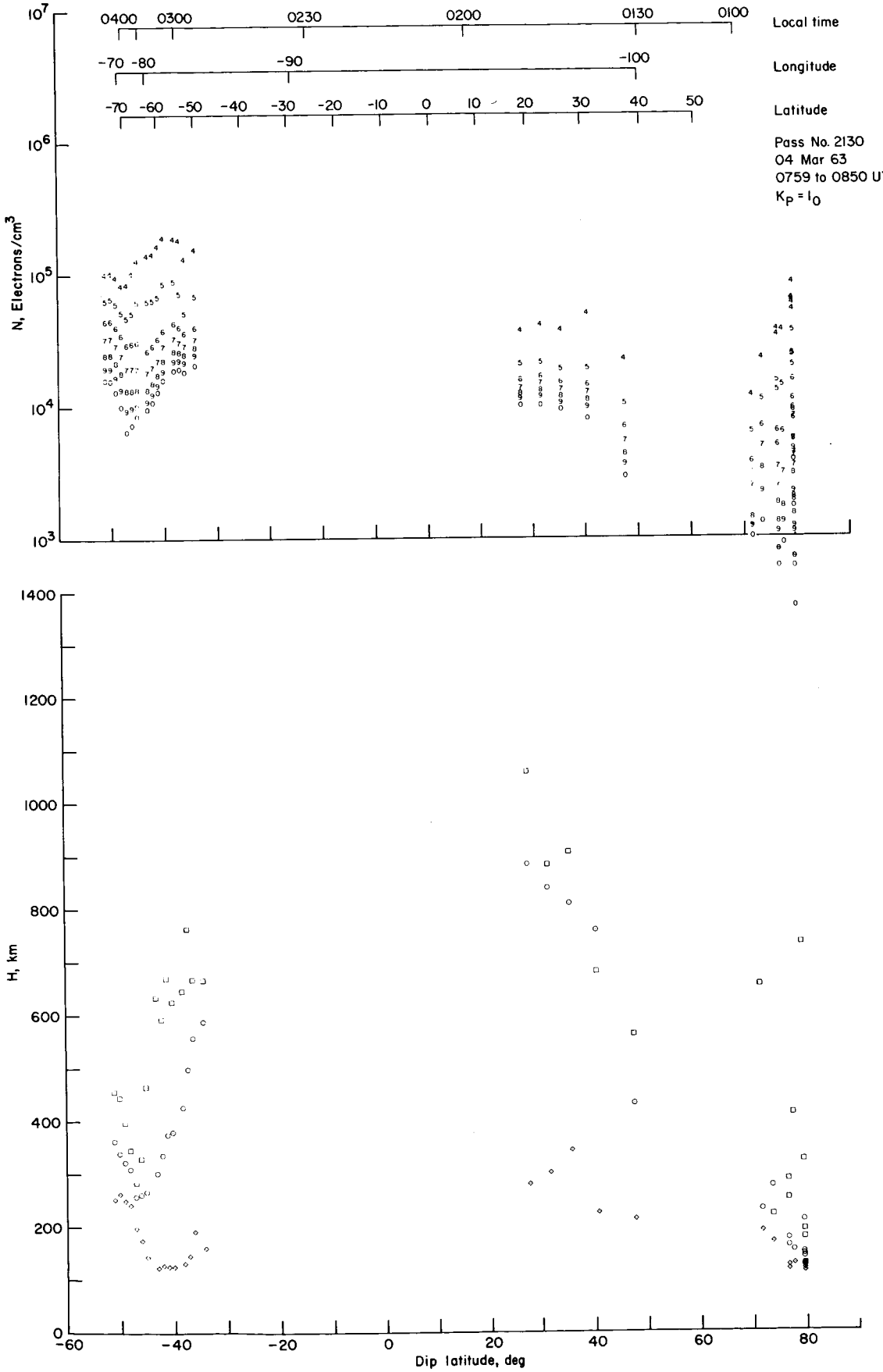

0400 0300 0230 0200 0130 0100
Local time
-70 -80 -90 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 2130
04 Mar 63
0759 to 0850 UT
$K_P = 1_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 50

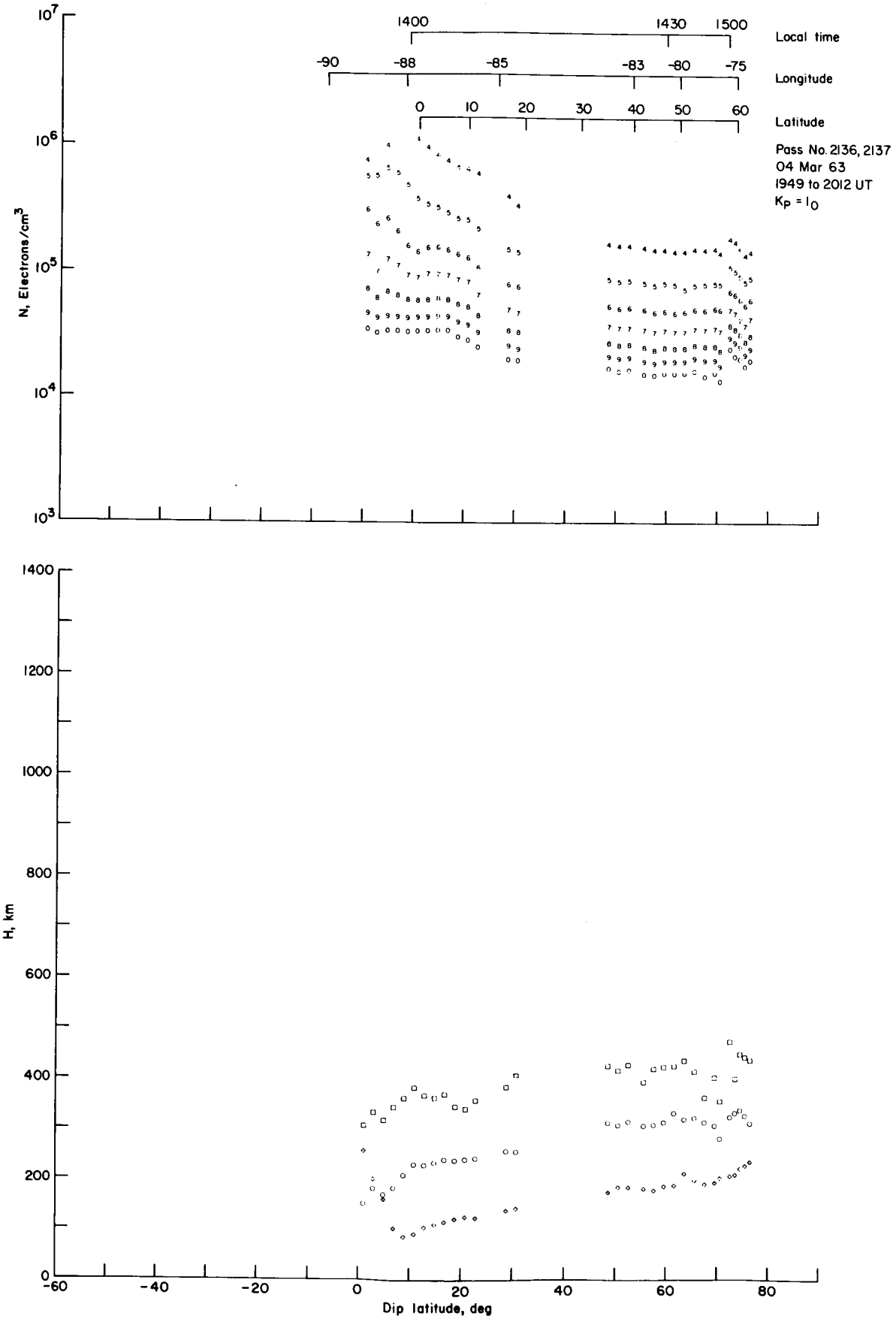

1400
1430
1500
Local time
-90
-88
-85
-83
-80
-75
Longitude
0
10
20
30
40
50
60
Latitude
Pass No. 2136, 2137
04 Mar 63
1949 to 2012 UT
$K_P = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 51

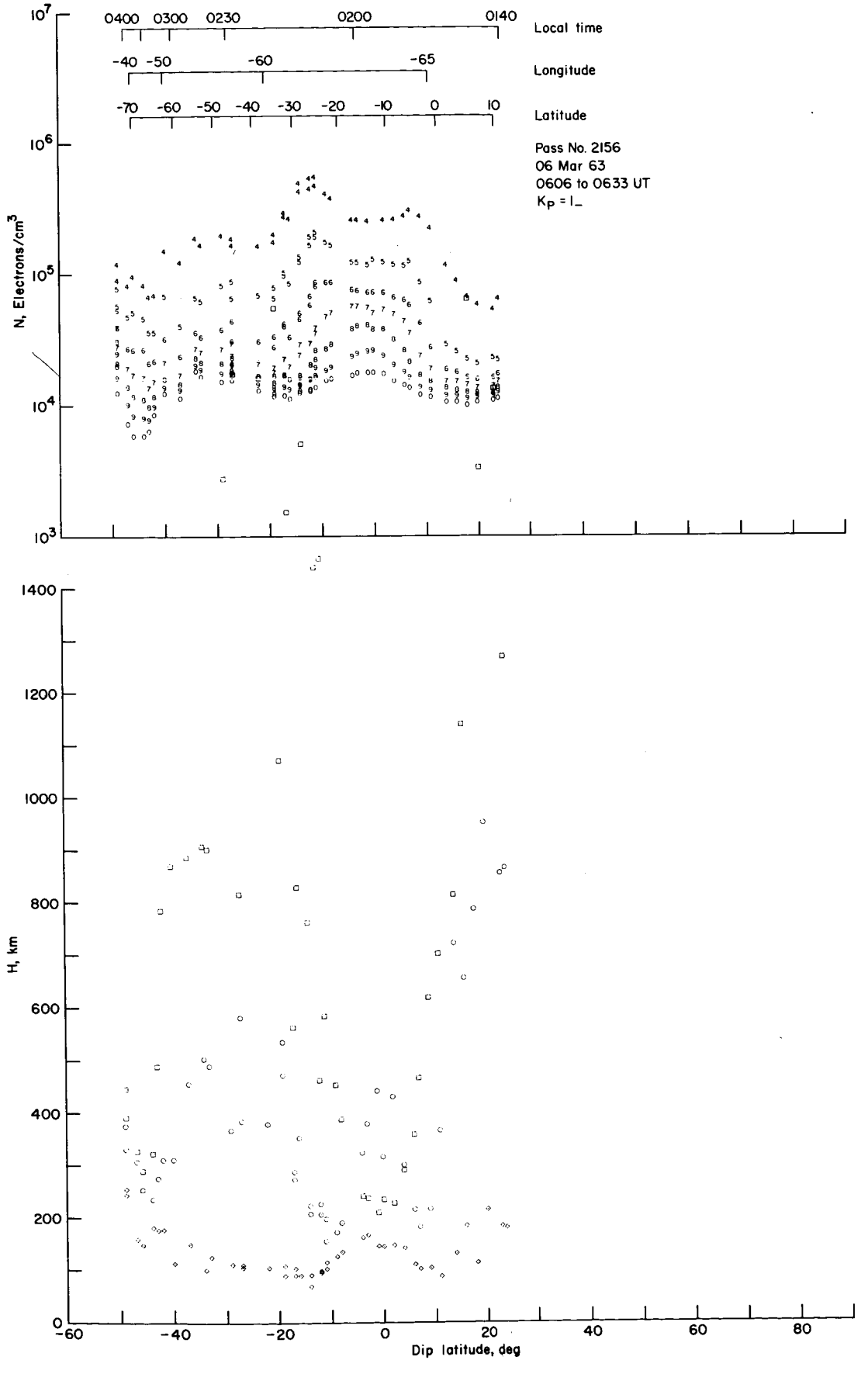

0400 0300 0230 0200 0140
Local time
-40 -50 -60 -65
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10
Latitude
Pass No. 2156
06 Mar 63
0606 to 0633 UT
Kp = 1_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 52

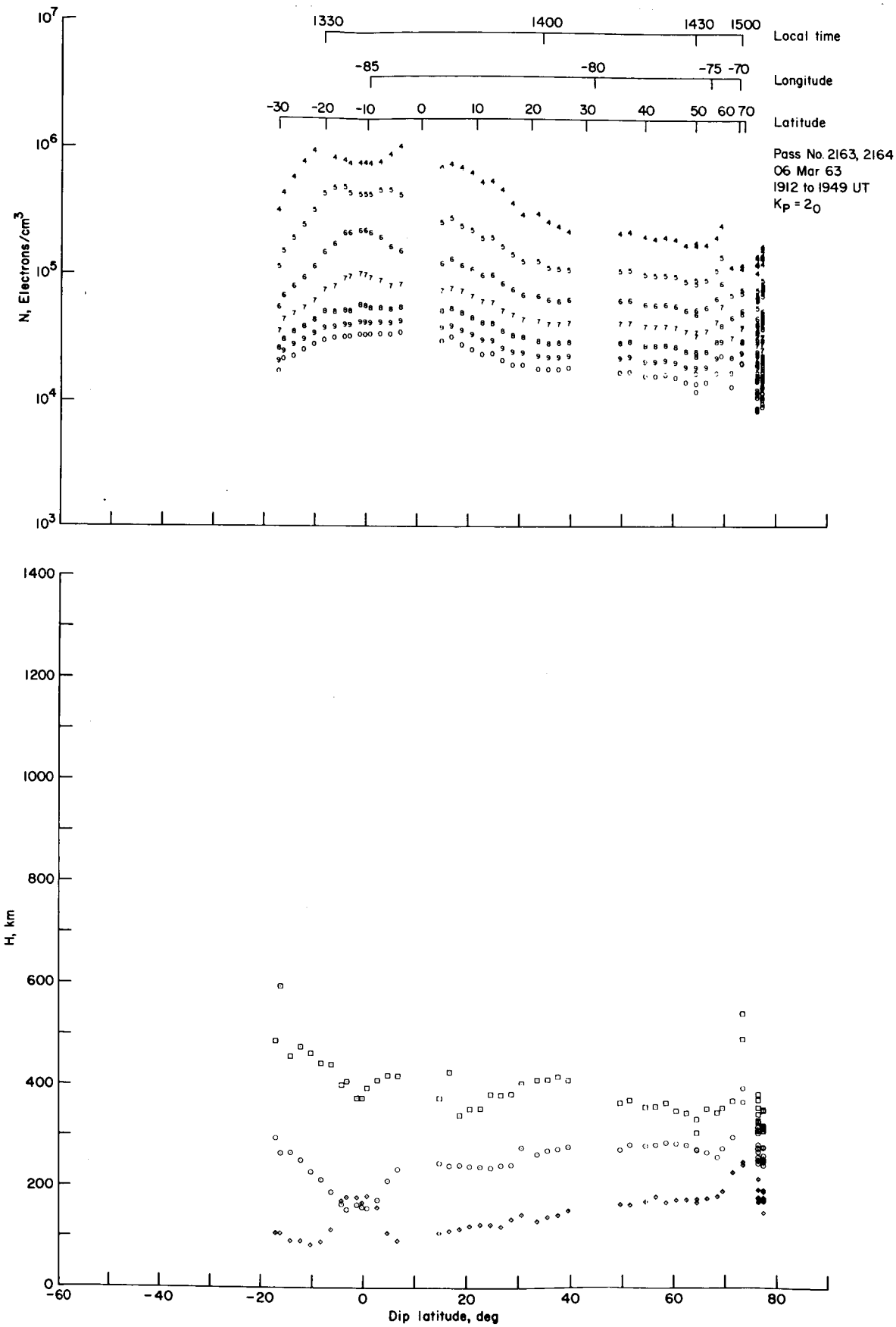

1330
1400
1430
1500
Local time
-85
-80
-75
-70
Longitude
-30
-20
-10
0
10
20
30
40
50
60
70
Latitude
Pass No. 2163, 2164
06 Mar 63
1912 to 1949 UT
$K_P = 2_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 53

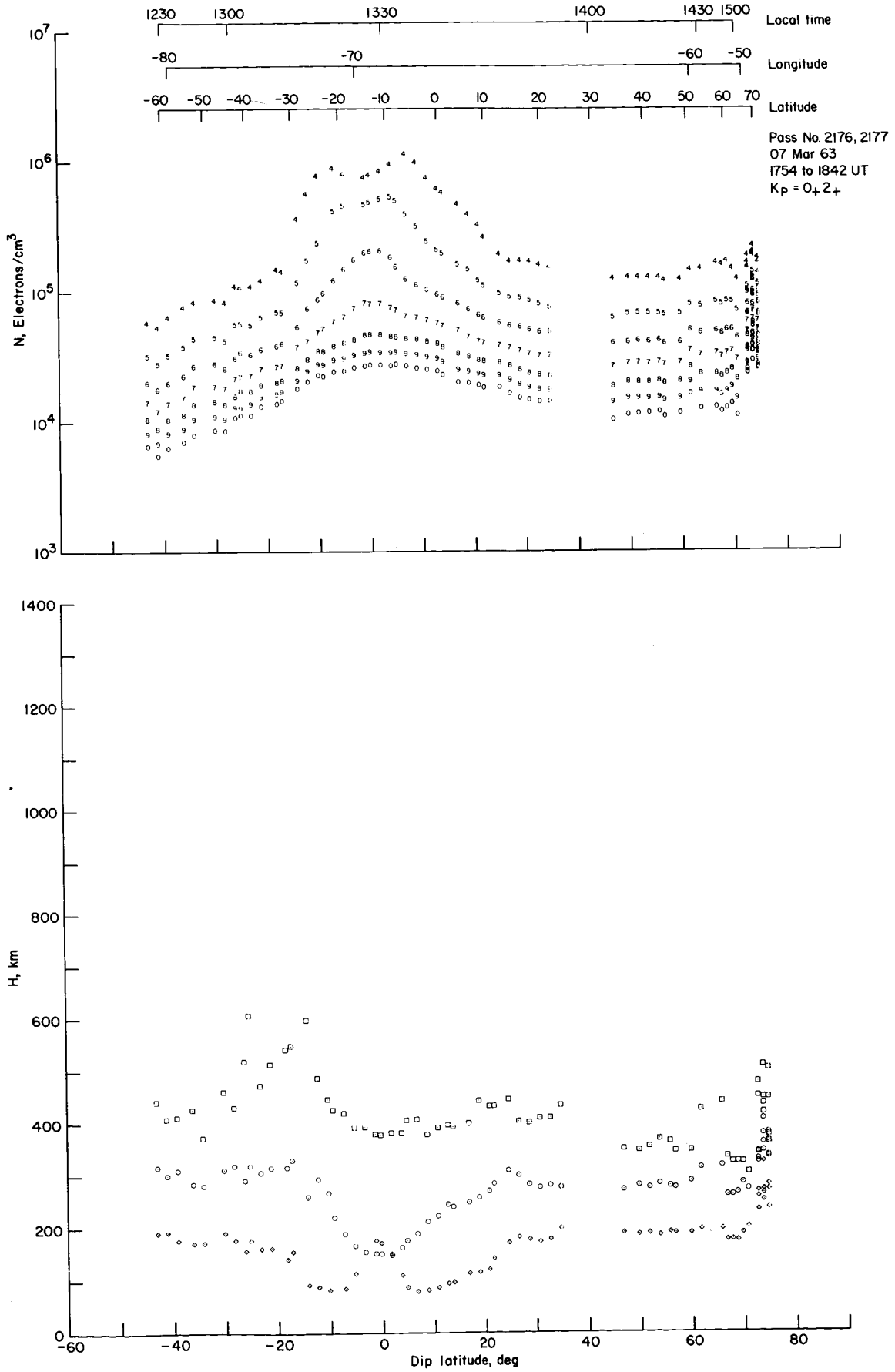

1230
1300
1330
1400
1430
1500
Local time
-80
-70
-60
-50
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 2176, 2177
07 Mar 63
1754 to 1842 UT
$K_P = 0_+ 2_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 54

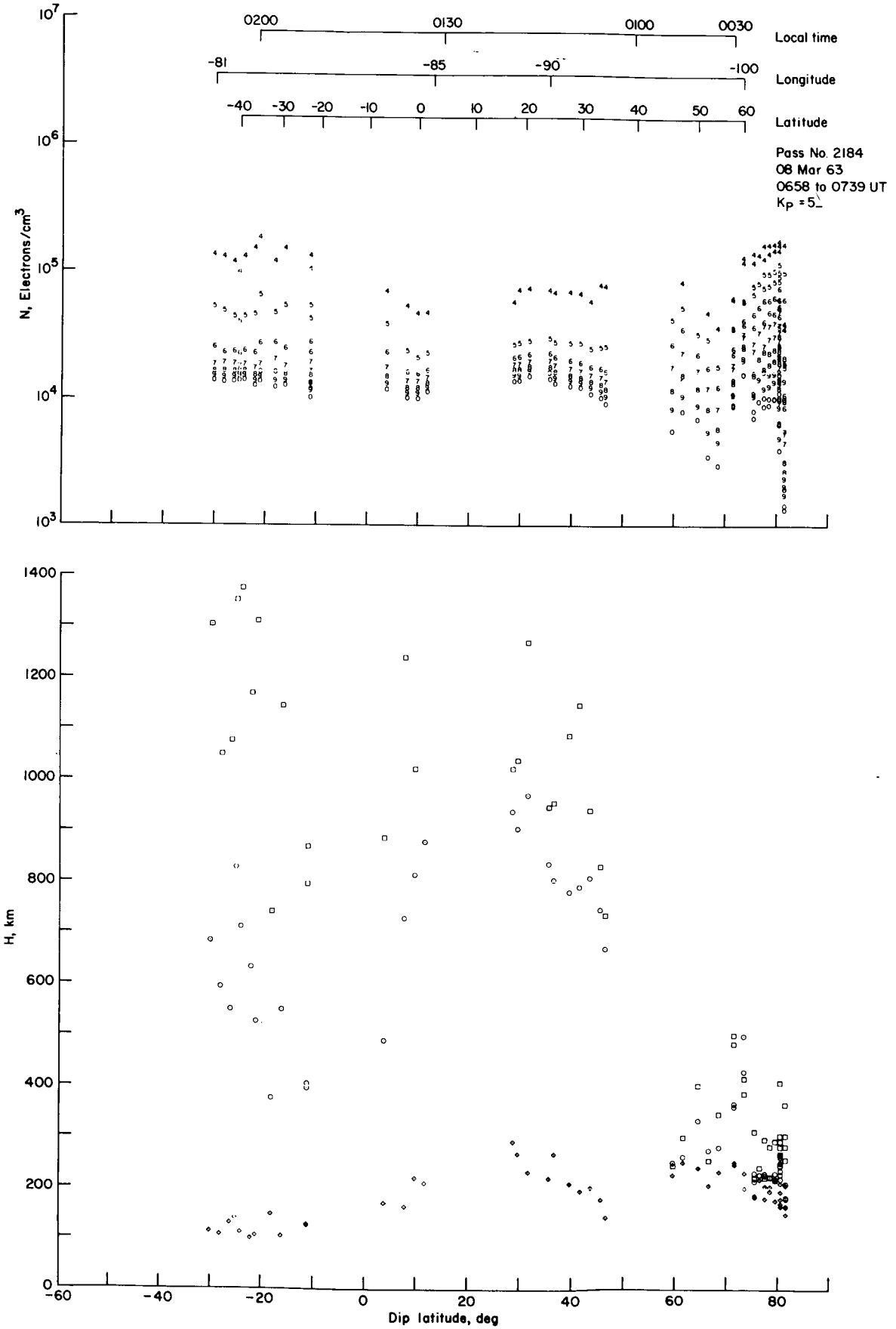

0200
0130
0100
0030
Local time
-81
-85
-90
-100
Longitude
-40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2184
08 Mar 63
0658 to 0739 UT
Kp = 5-
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 55

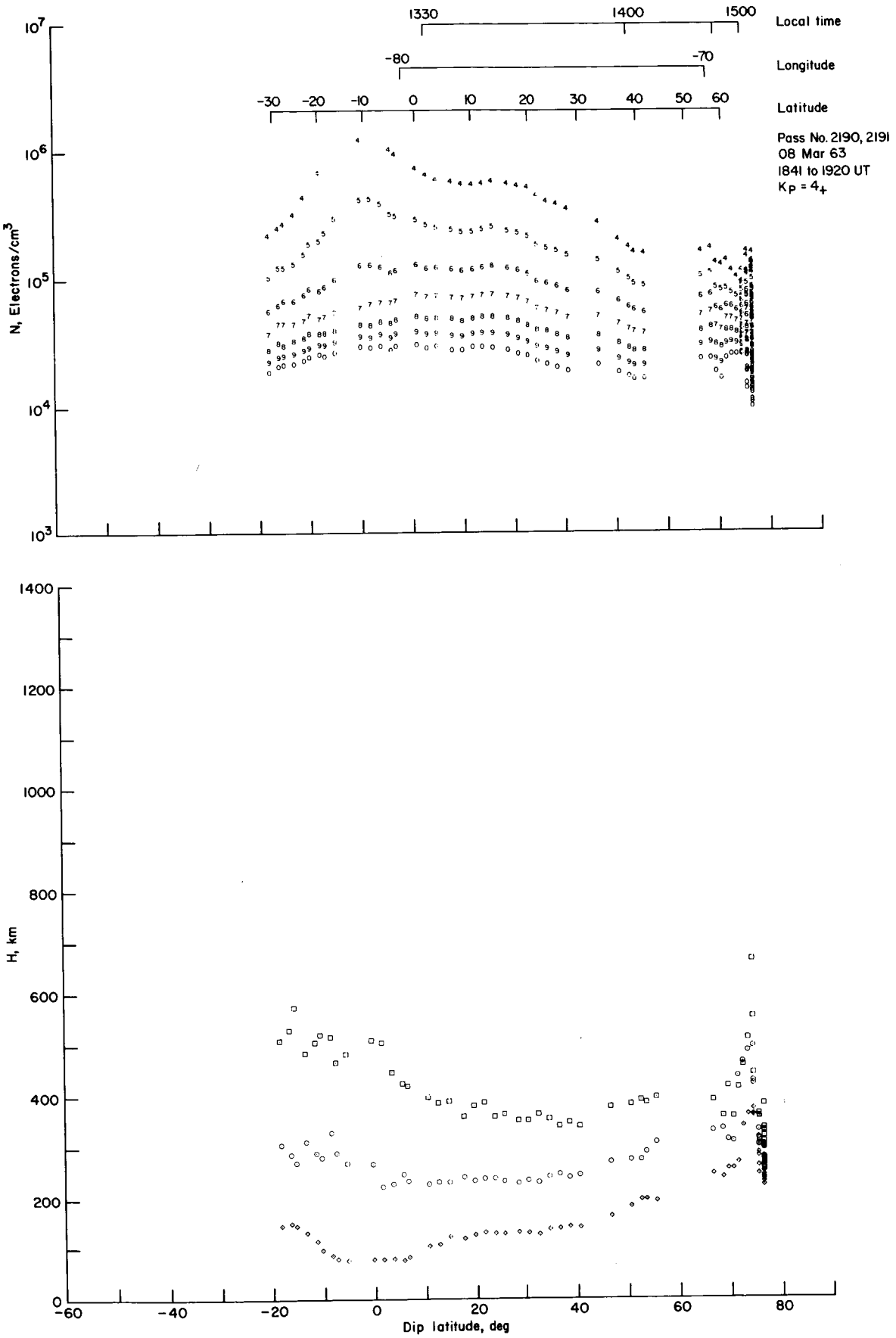

1330
1400
1500
Local time
-80
-70
Longitude
-30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2190, 2191
08 Mar 63
1841 to 1920 UT
$K_P = 4_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 56

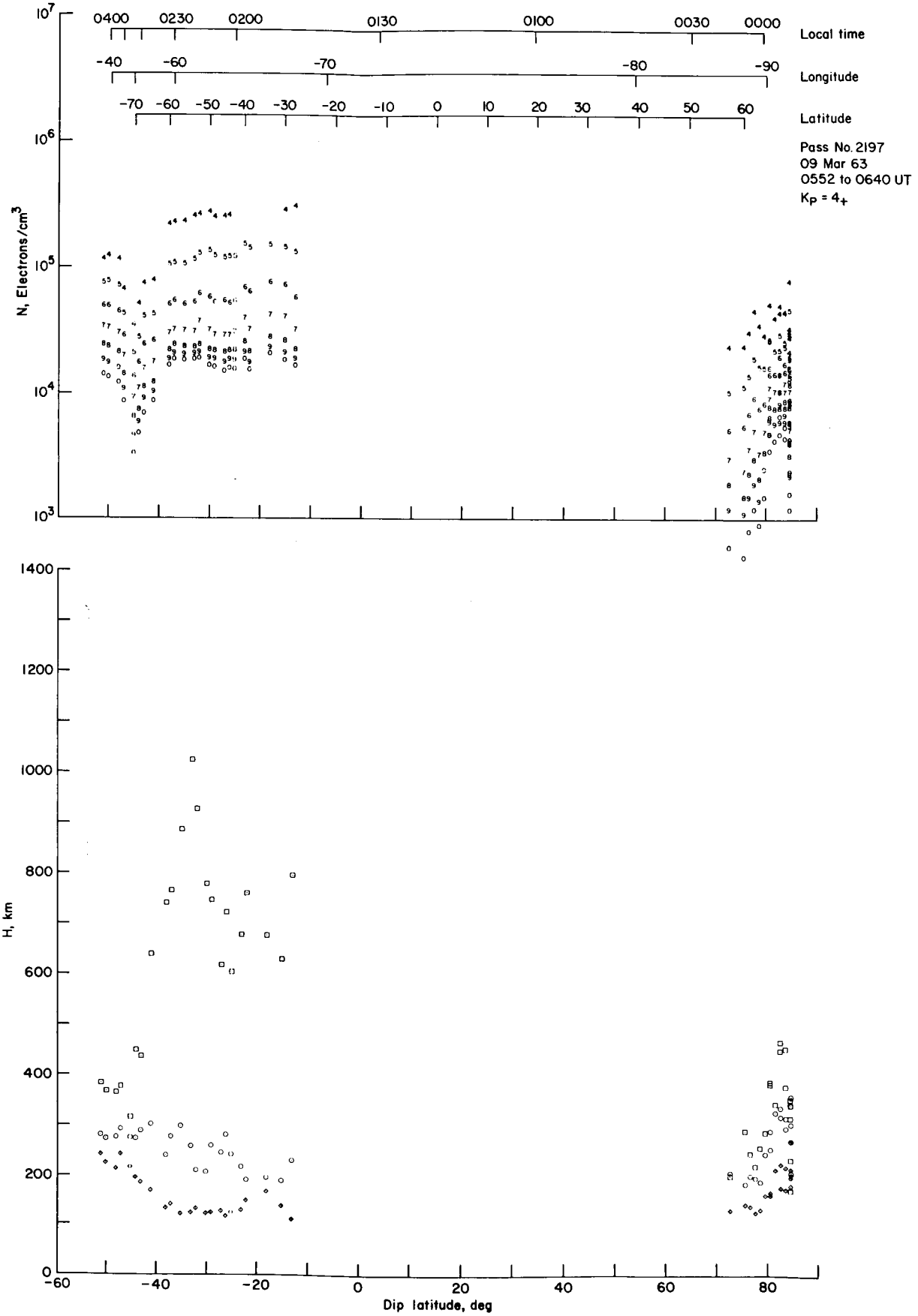

0400 0230 0200 0130 0100 0030 0000
Local time
-40 -60 -70 -80 -90
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2197
09 Mar 63
0552 to 0640 UT
$K_P = 4_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 57

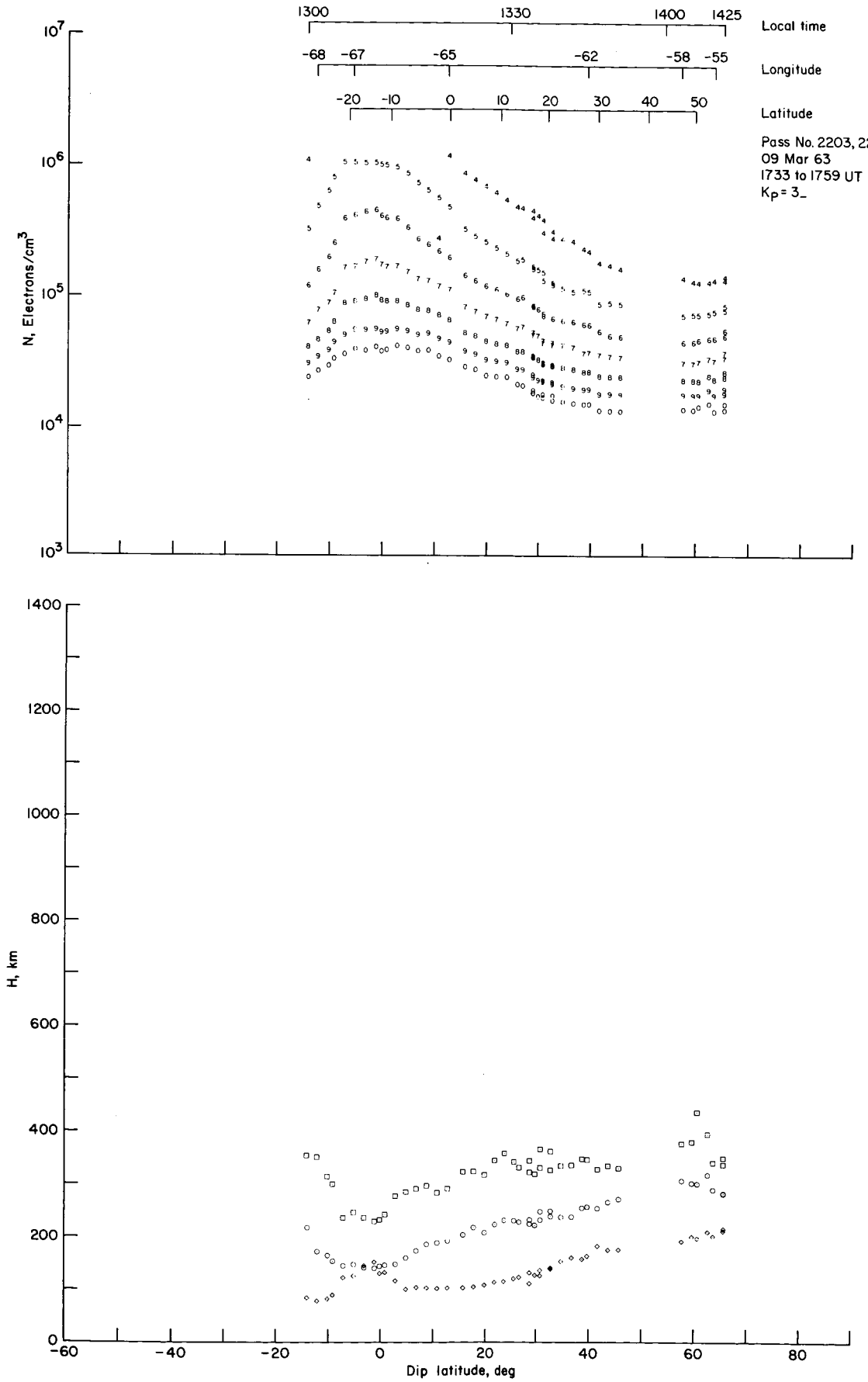

1300
1330
1400
1425
Local time
-68 -67 -65 -62 -58 -55
Longitude
-20 -10 0 10 20 30 40 50
Latitude
Pass No. 2203, 2204
09 Mar 63
1733 to 1759 UT
Kp = 3_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 58

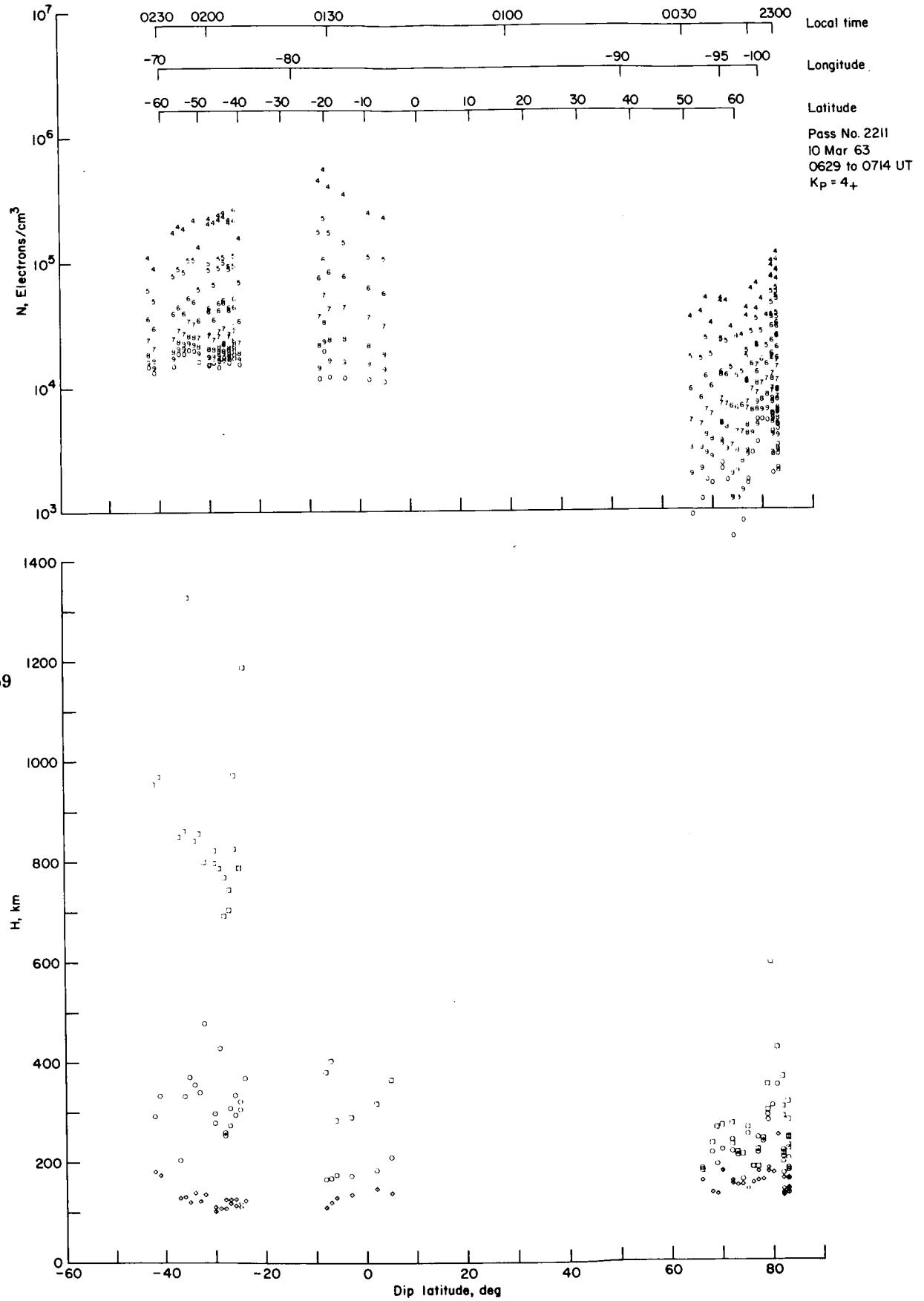

0230 0200 0130 0100 0030 2300
Local time
-70 -80 -90 -95 -100
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2211
10 Mar 63
0629 to 0714 UT
$K_P = 4_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 59

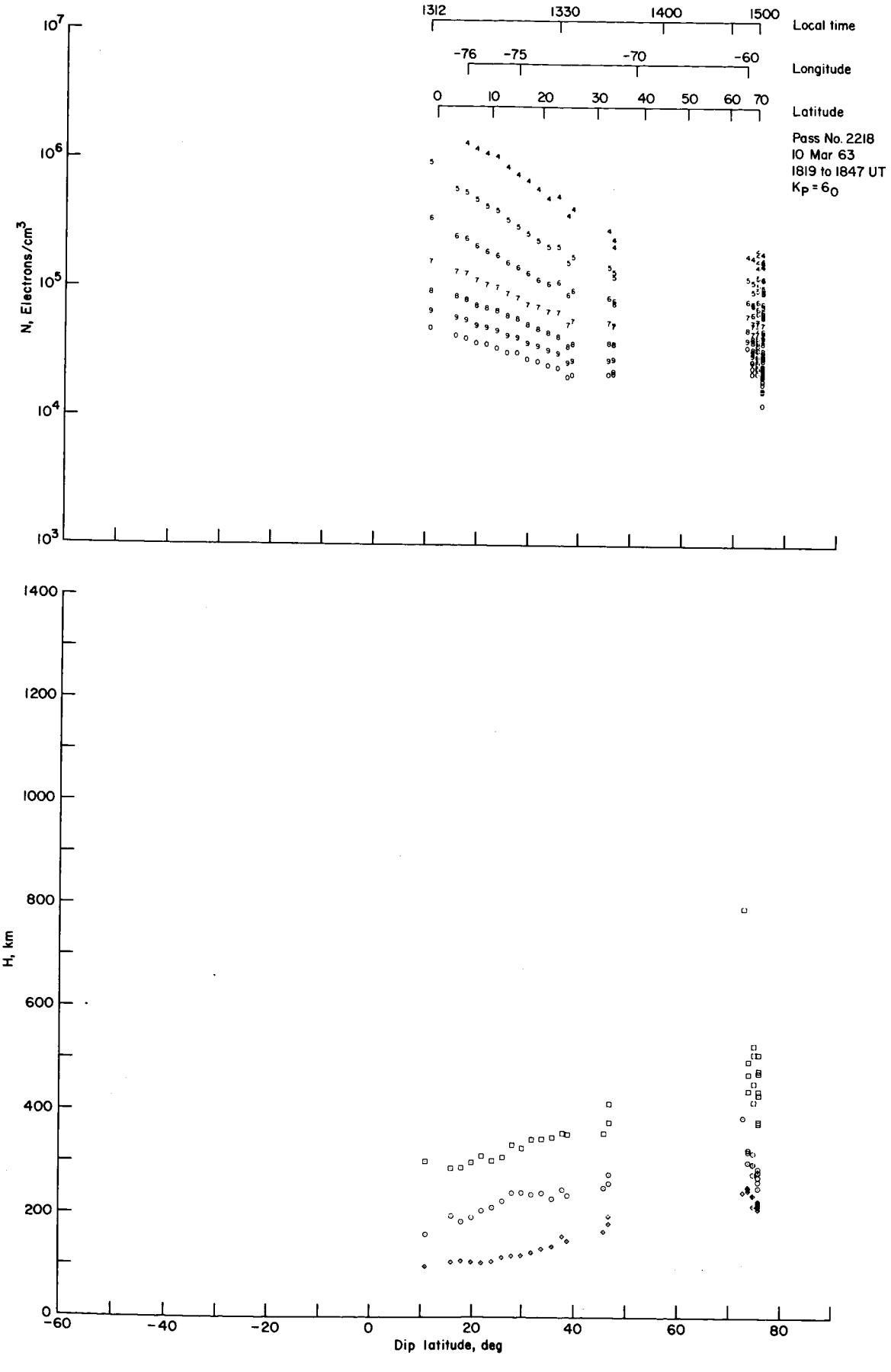

1312
1330
1400
1500
Local time
-76
-75
-70
-60
Longitude
0
10
20
30
40
50
60
70
Latitude
Pass No. 2218
10 Mar 63
1819 to 1847 UT
$K_P = 6_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 60

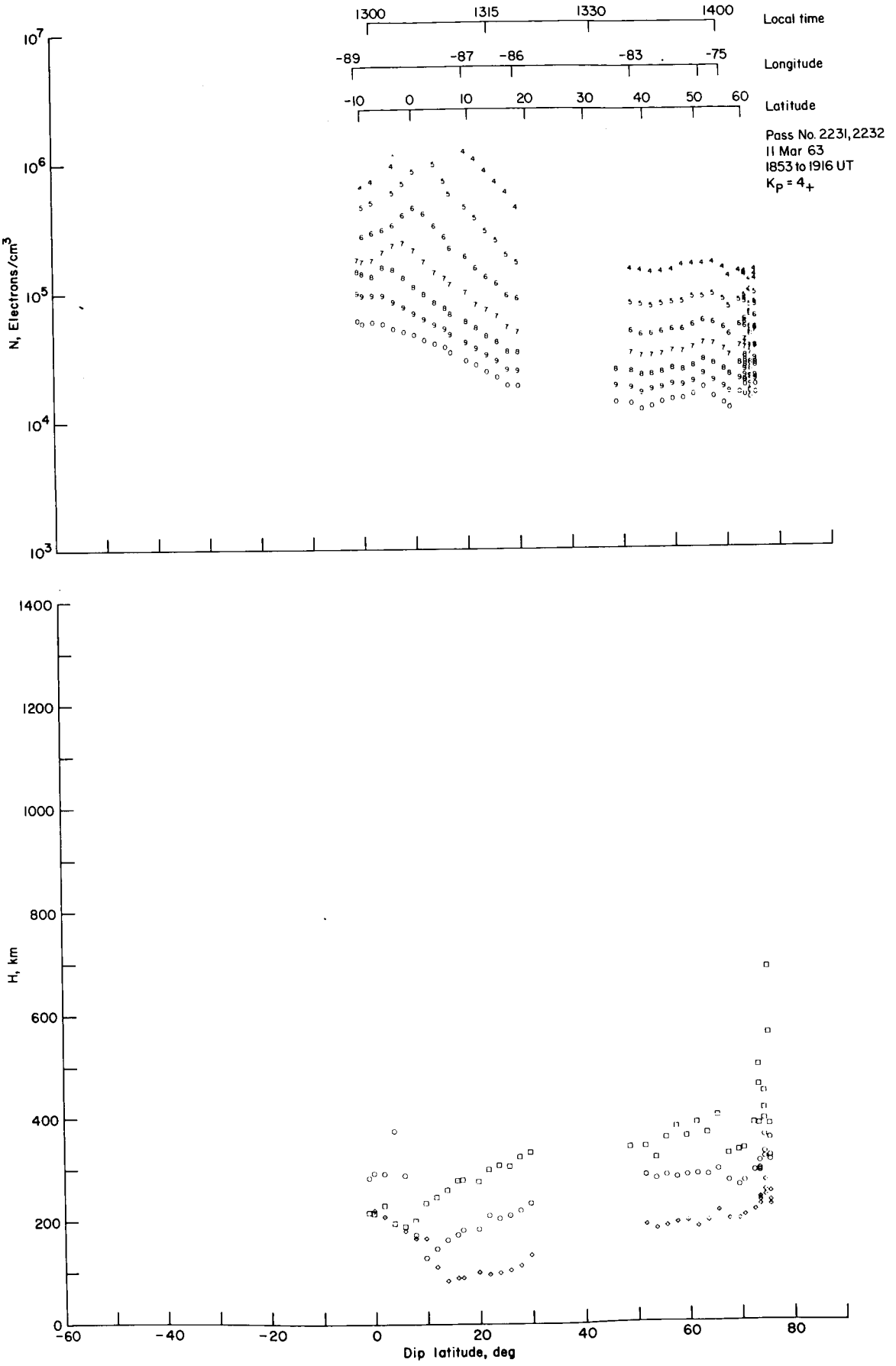

1300
1315
1330
1400
Local time
-89
-87
-86
-83
-75
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 2231, 2232
11 Mar 63
1853 to 1916 UT
$K_P = 4_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 61

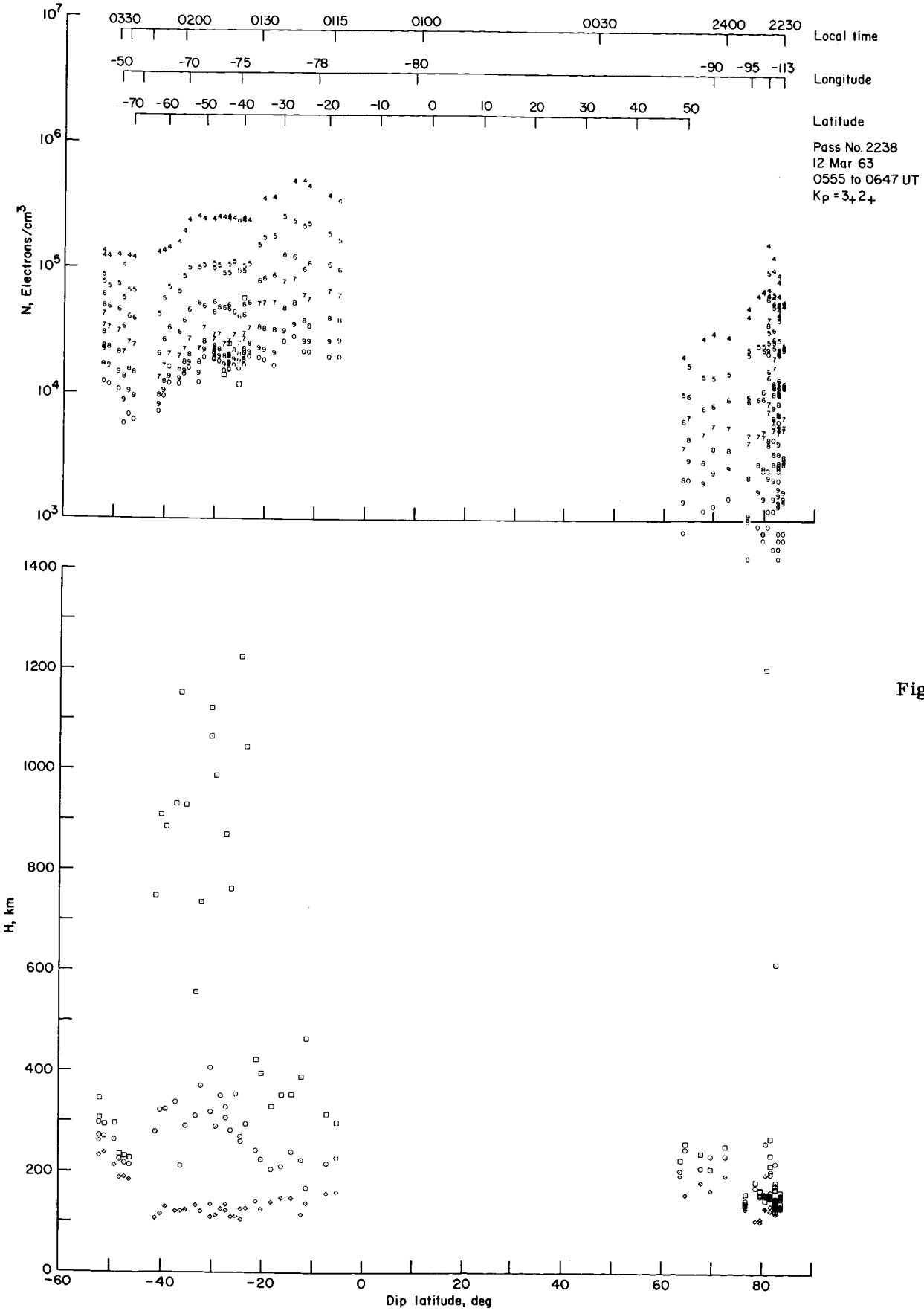
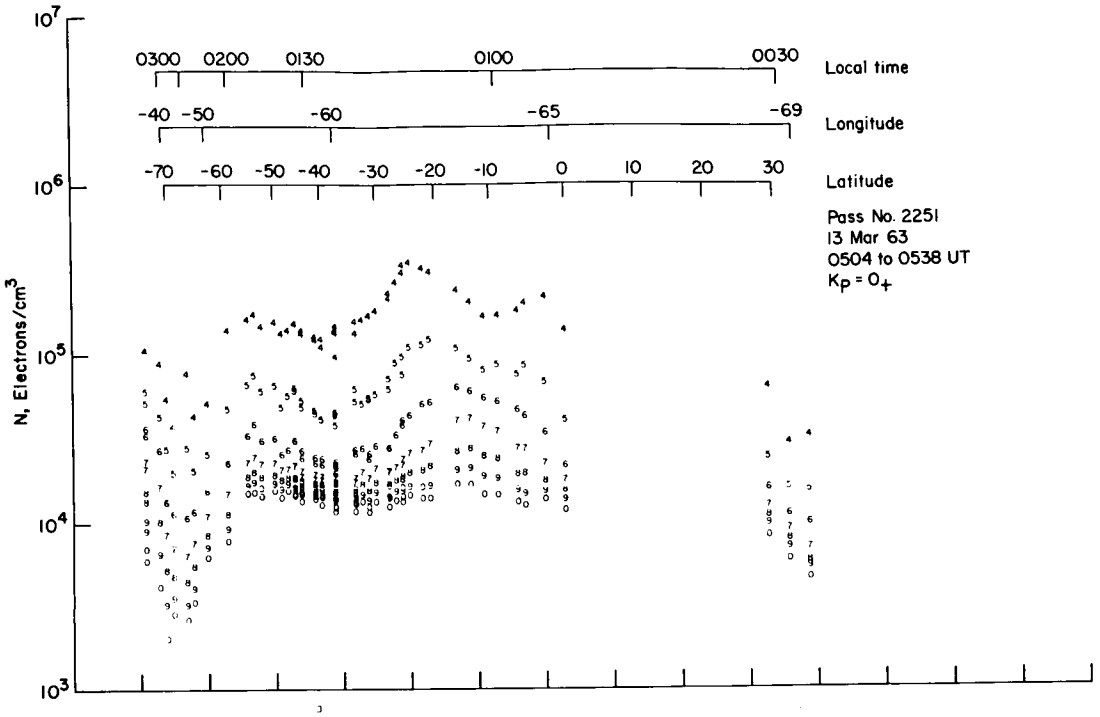

0330
0200
0130
0115
0100
0030
2400
2230
Local time
-50
-70
-75
-78
-80
-90
-95
-113
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 2238
12 Mar 63
0555 to 0647 UT
$K_p = 3_+ 2_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 62


0300 0200 0130 0100 0030
Local time
-40 -50 -60 -65 -69
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30
Latitude
Pass No. 2251
13 Mar 63
0504 to 0538 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

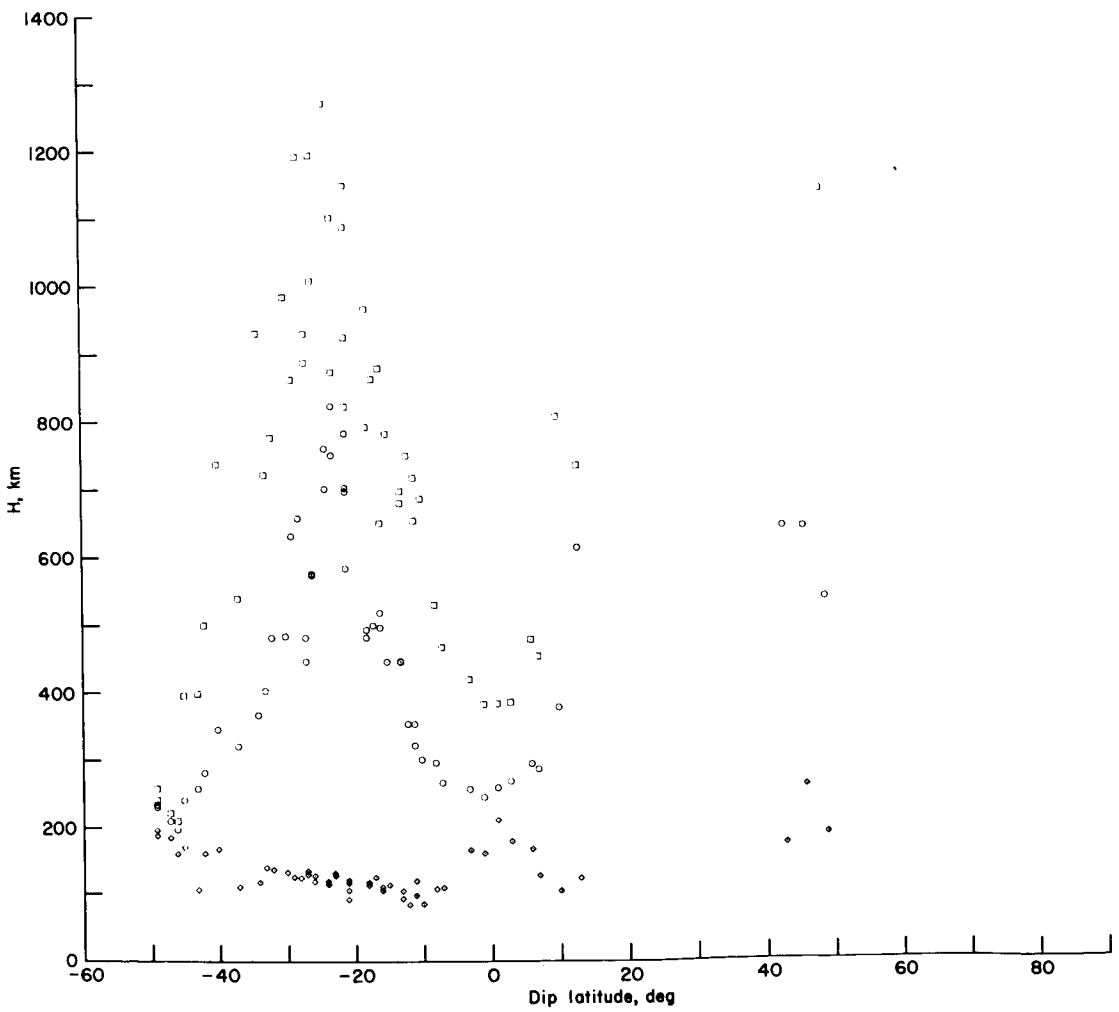

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 63

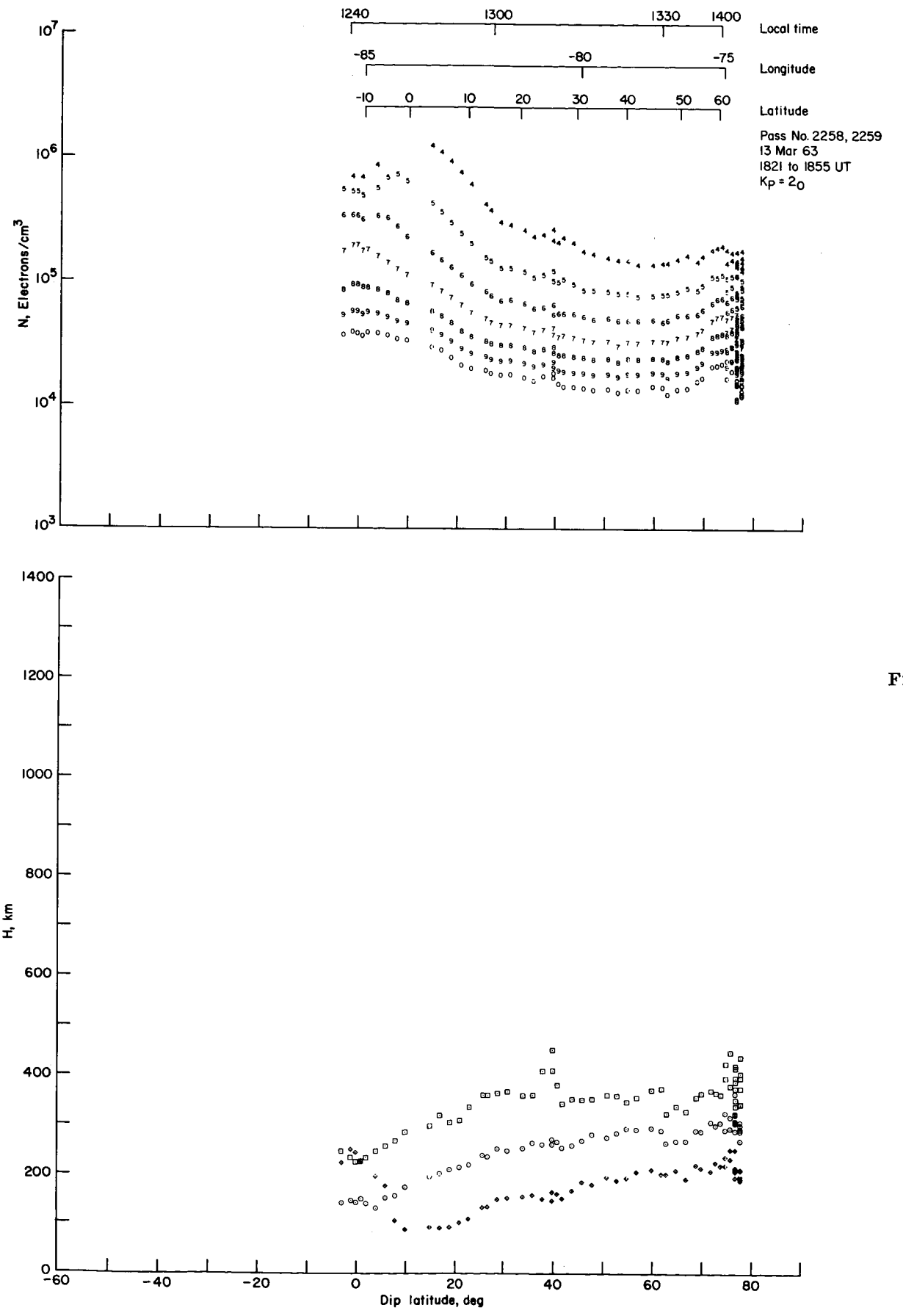

1240
1300
1330
1400
Local time
-85
-80
-75
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 2258, 2259
13 Mar 63
1821 to 1855 UT
$K_P = 2_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 64

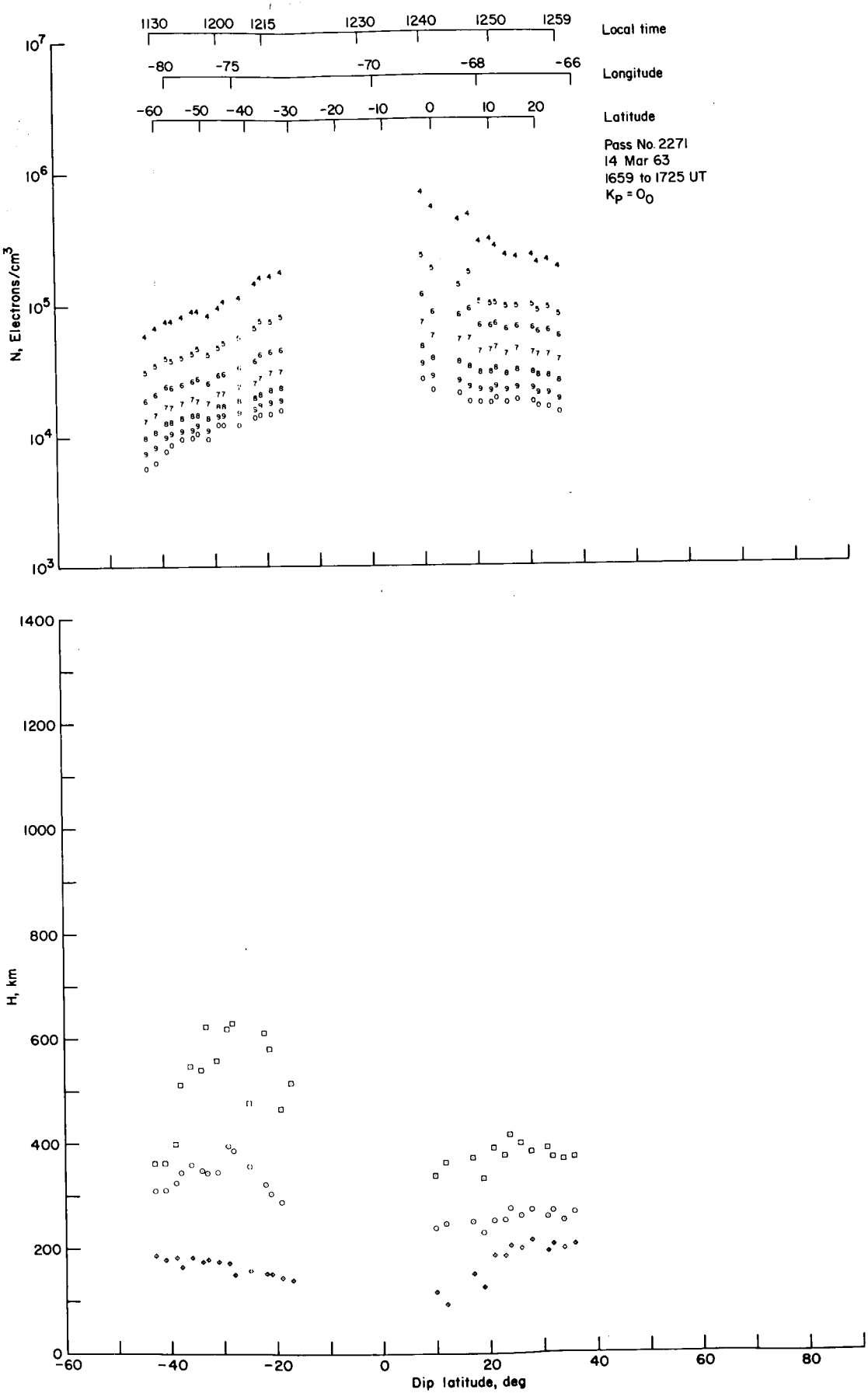

1130 1200 1215 1230 1240 1250 1259
Local time
-80 -75 -70 -68 -66
Longitude
-60 -50 -40 -30 -20 -10 0 10 20
Latitude
Pass No. 2271
14 Mar 63
1659 to 1725 UT
$K_P = 0_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 65

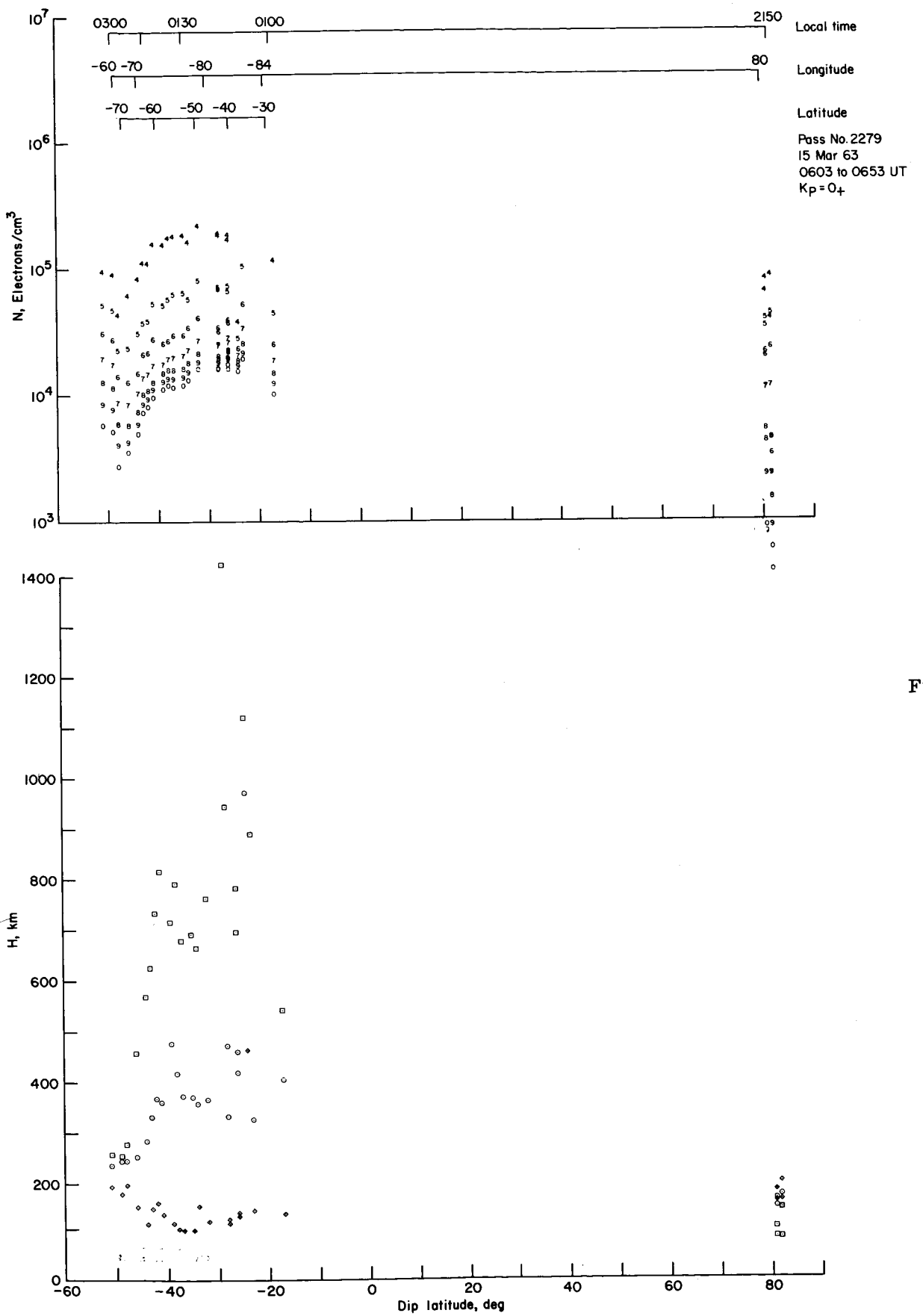

0300
0130
0100
2150
Local time
-60 -70
-80
-84
80
Longitude
-70 -60 -50 -40 -30
Latitude
Pass No. 2279
15 Mar 63
0603 to 0653 UT
Kp = 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 66

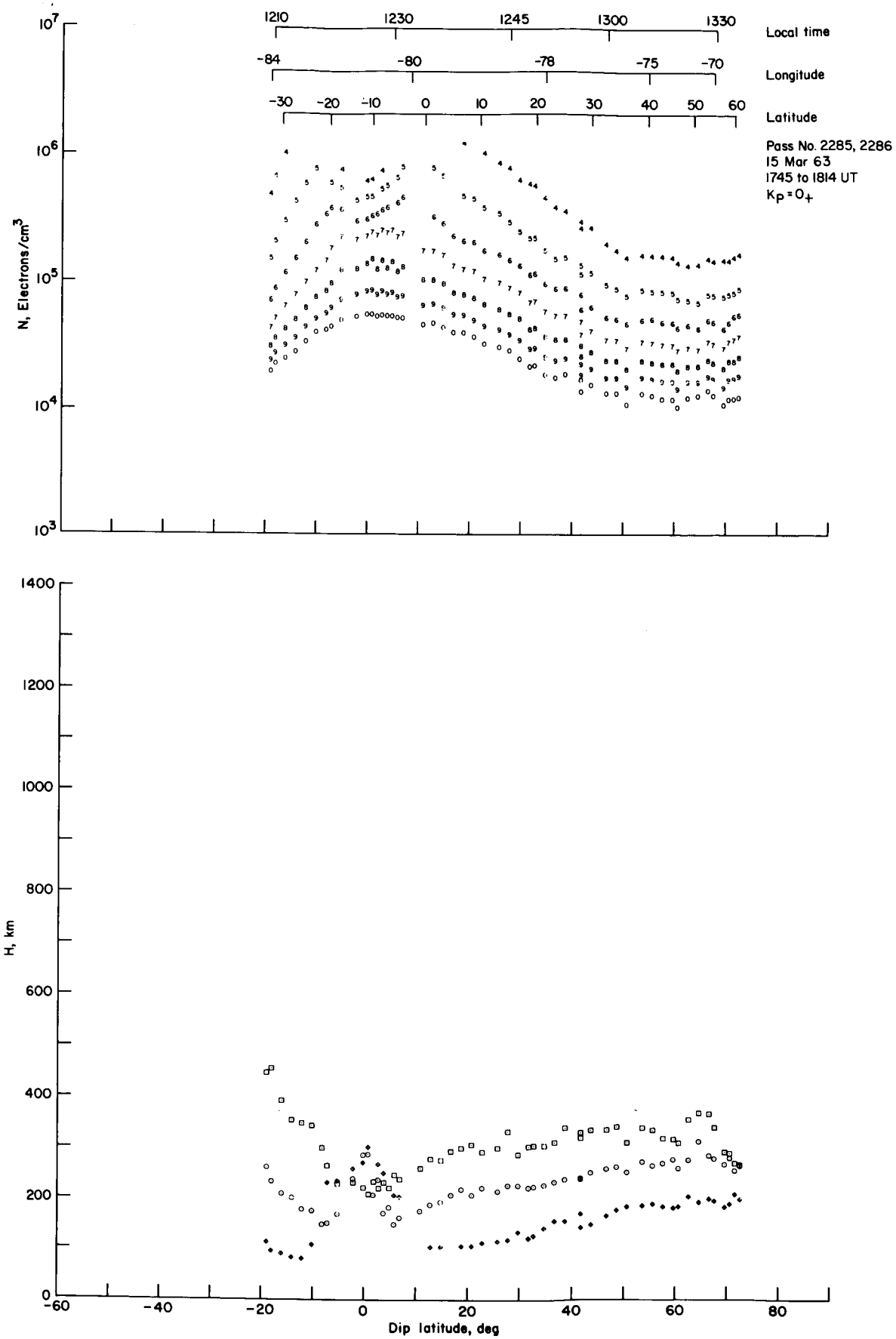

1210
1230
1245
1300
1330
Local time
-84
-80
-78
-75
-70
Longitude
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 2285, 2286
15 Mar 63
1745 to 1814 UT
Kp = 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 67

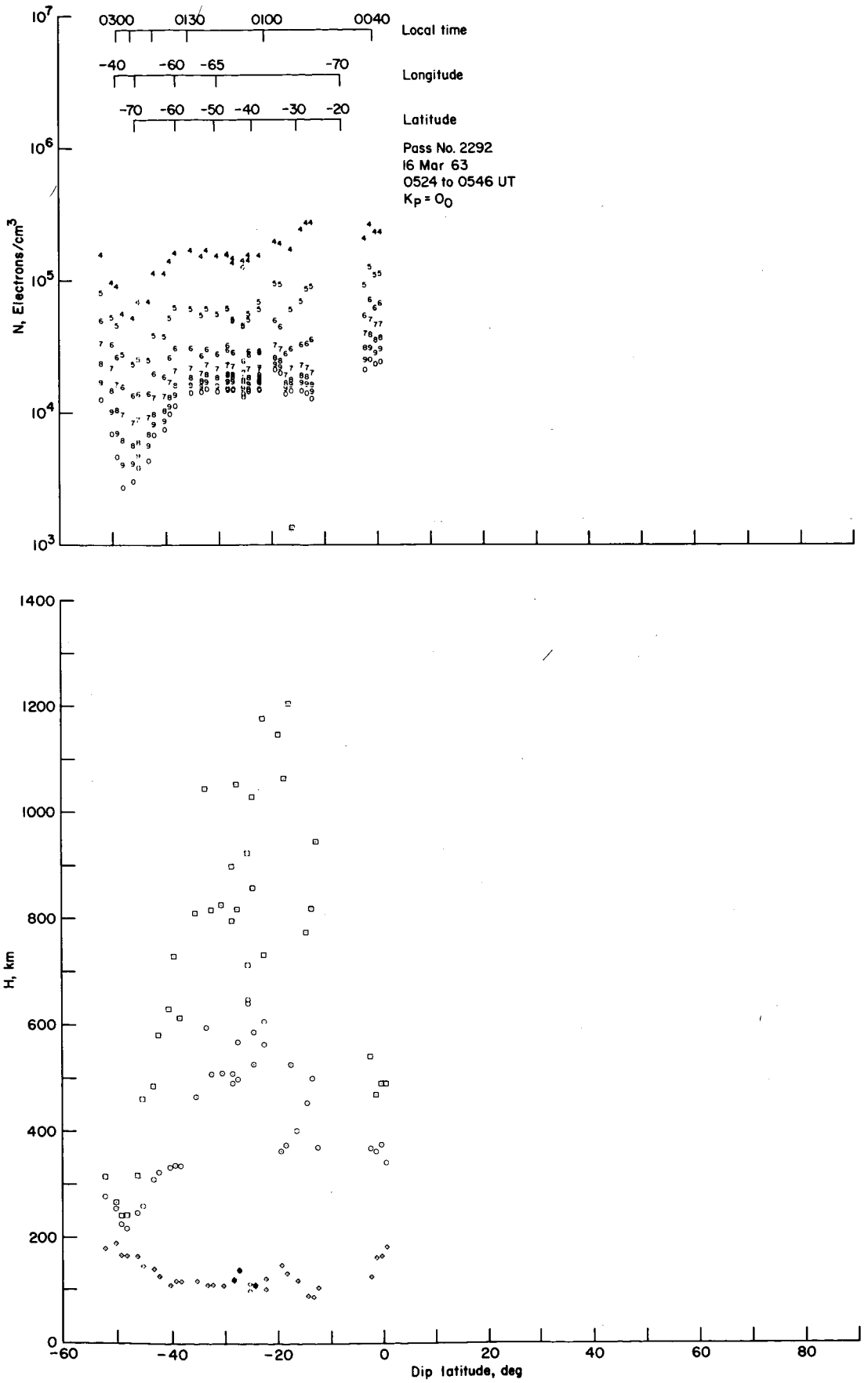

0300
0130
0100
0040
Local time
-40
-60
-65
-70
Longitude
-70
-60
-50
-40
-30
-20
Latitude
Pass No. 2292
16 Mar 63
0524 to 0546 UT
$K_P = 0_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 68

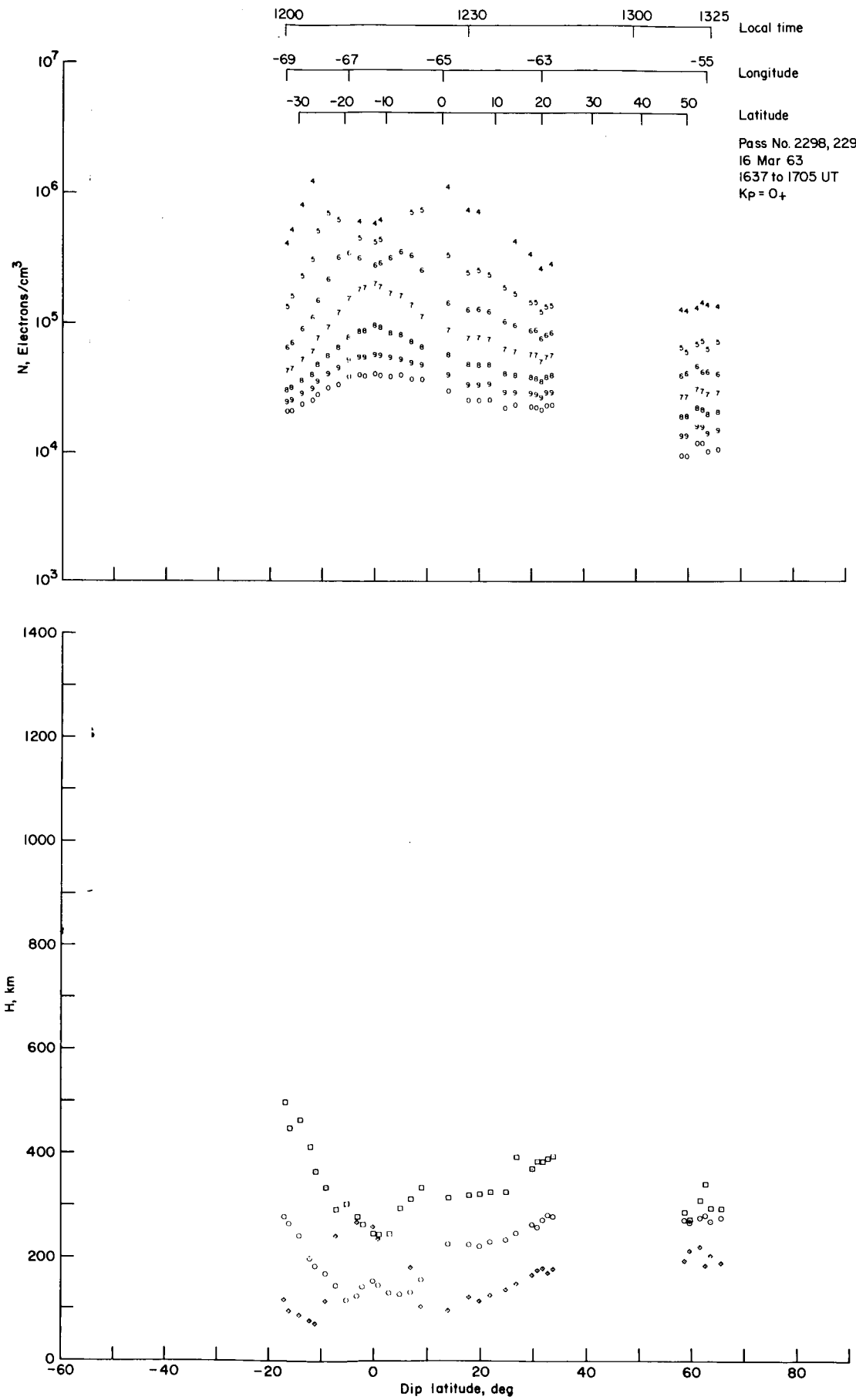

1200
1230
1300
1325
Local time
-69
-67
-65
-63
-55
Longitude
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 2298, 2299
16 Mar 63
1637 to 1705 UT
Kp = 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 69

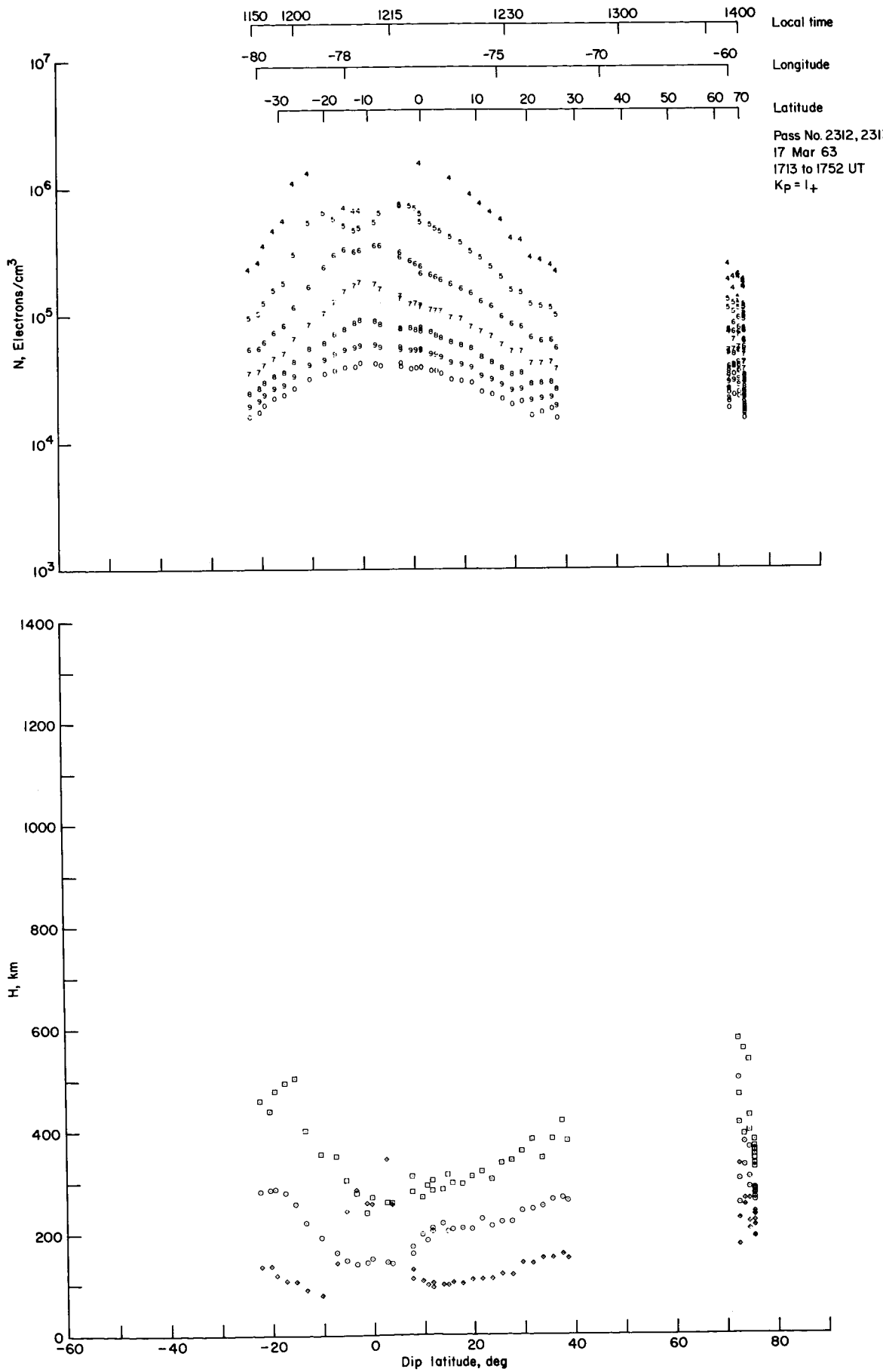
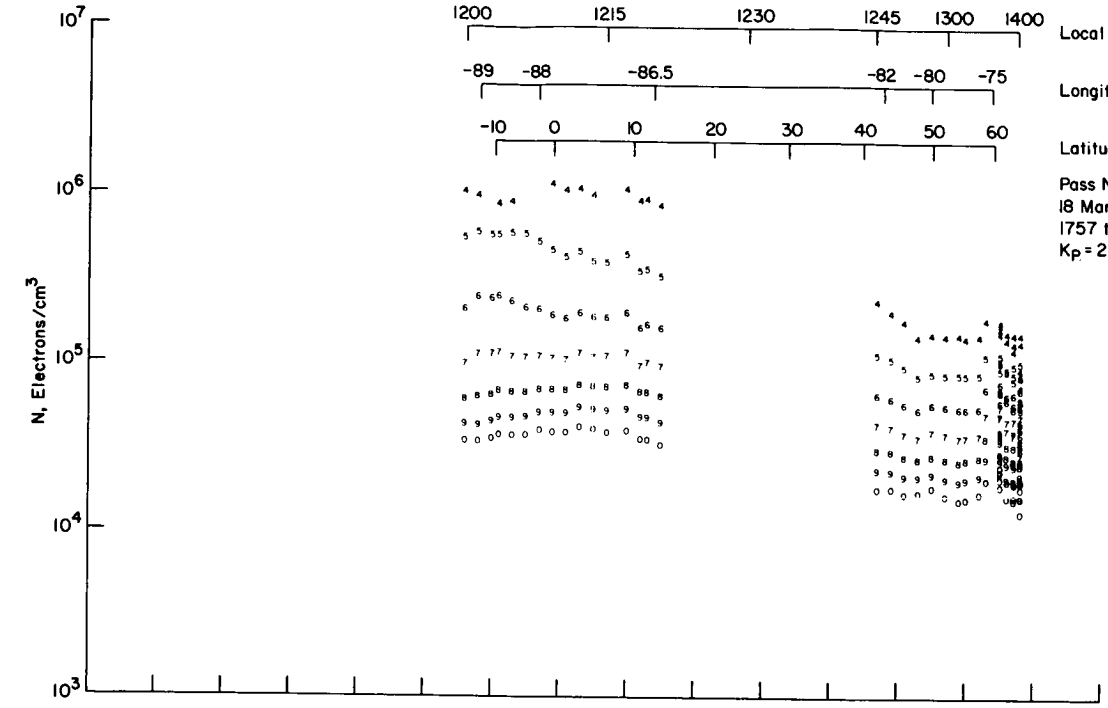

1150 1200 1215 1230 1300 1400
Local time
-80 -78 -75 -70 -60
Longitude
-30 -20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 2312, 2313
17 Mar 63
1713 to 1752 UT
$K_P = 1_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 70


1200
1215
1230
1245
1300
1400
Local time
-89
-88
-86.5
-82
-80
-75
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 2326, 2327
18 Mar 63
1757 to 1823 UT
$K_P = 2_0 1_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3

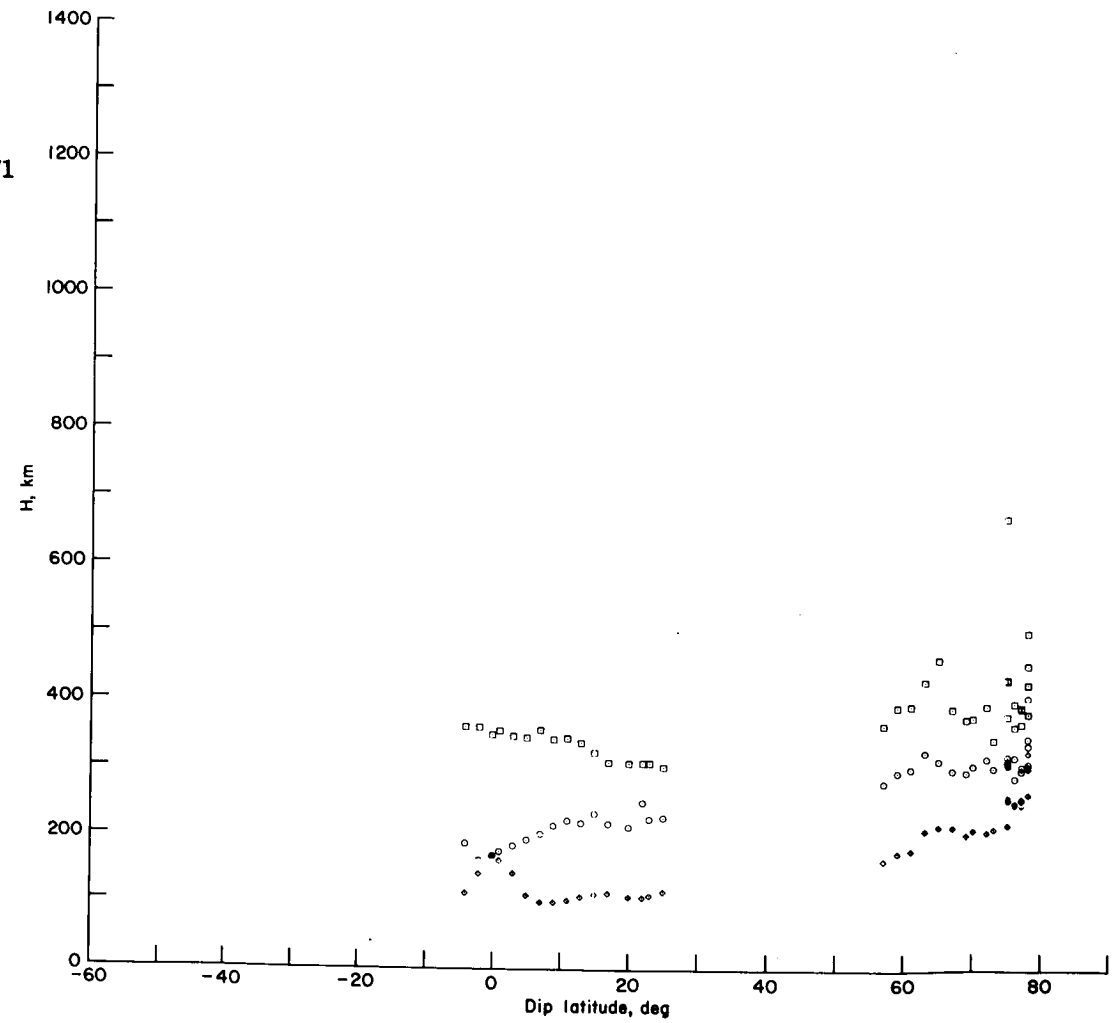

1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 71

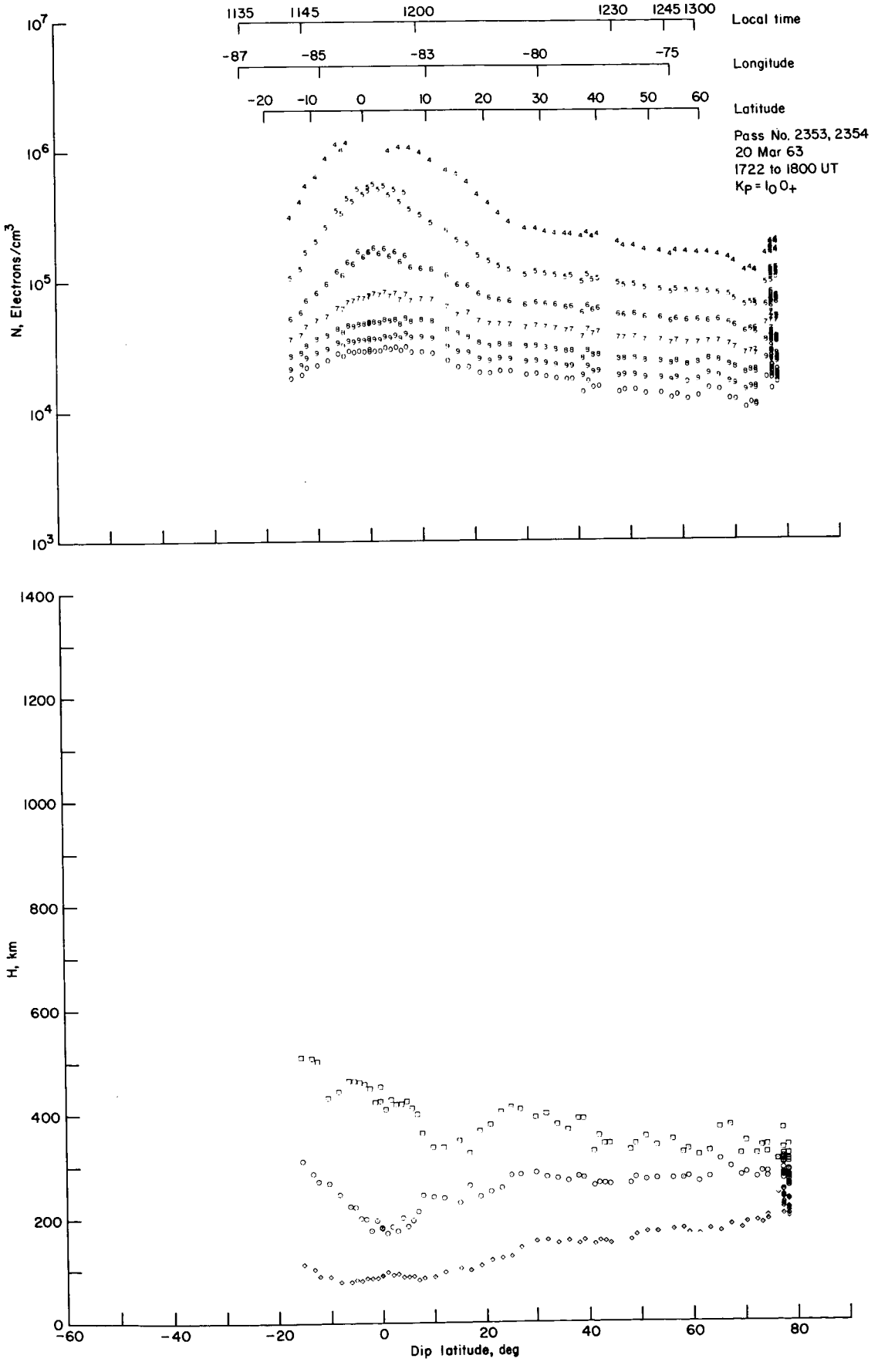

1135 1145 1200 1230 1245 1300
Local time
-87 -85 -83 -80 -75
Longitude
-20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2353, 2354
20 Mar 63
1722 to 1800 UT
Kp = 1- 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 72

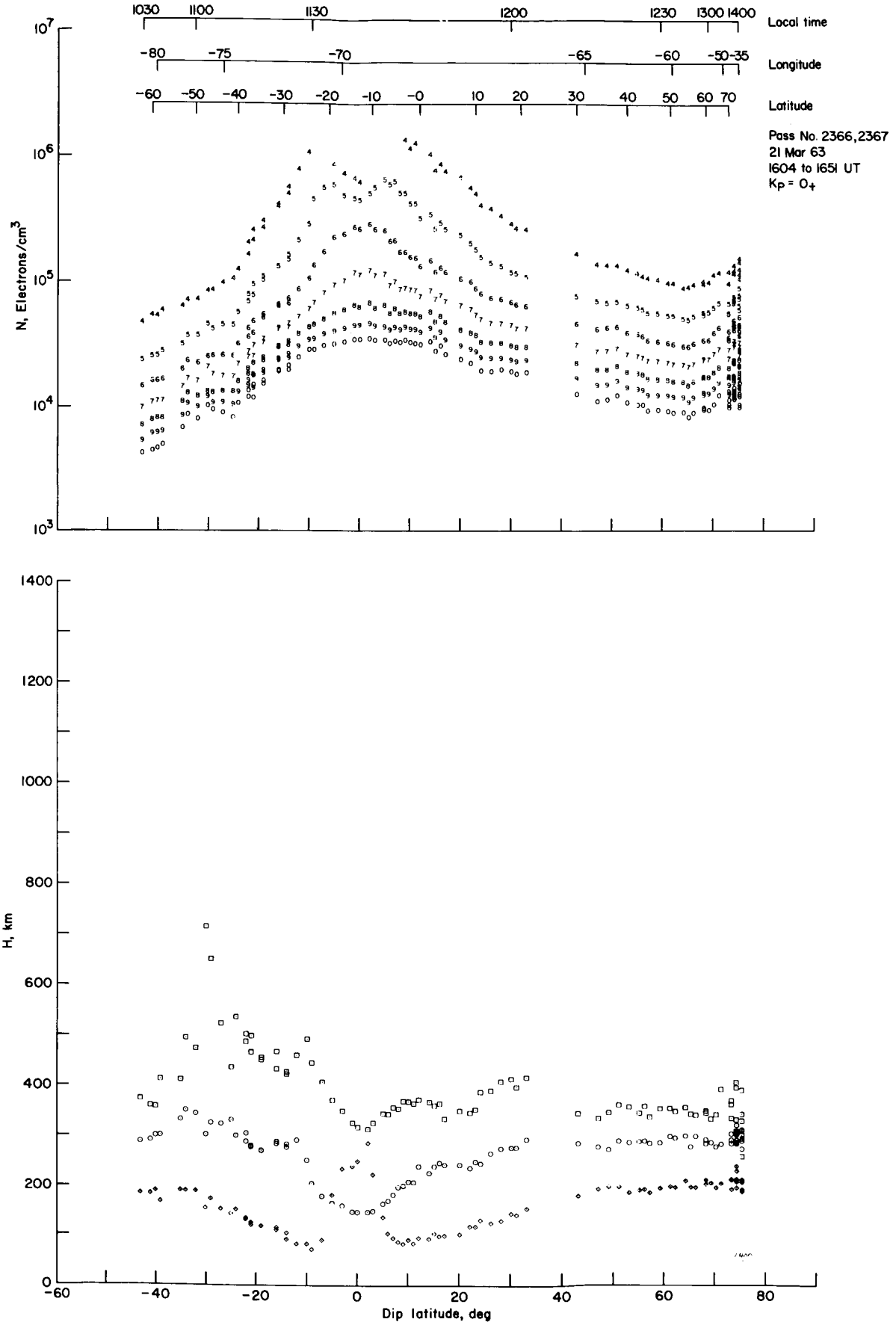

1030 1100 1130 1200 1230 1300 1400
Local time
-80 -75 -70 -65 -60 -50 -35
Longitude
-60 -50 -40 -30 -20 -10 -0 10 20 30 40 50 60 70
Latitude
Pass No. 2366,2367
21 Mar 63
1604 to 1651 UT
Kp = 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 73

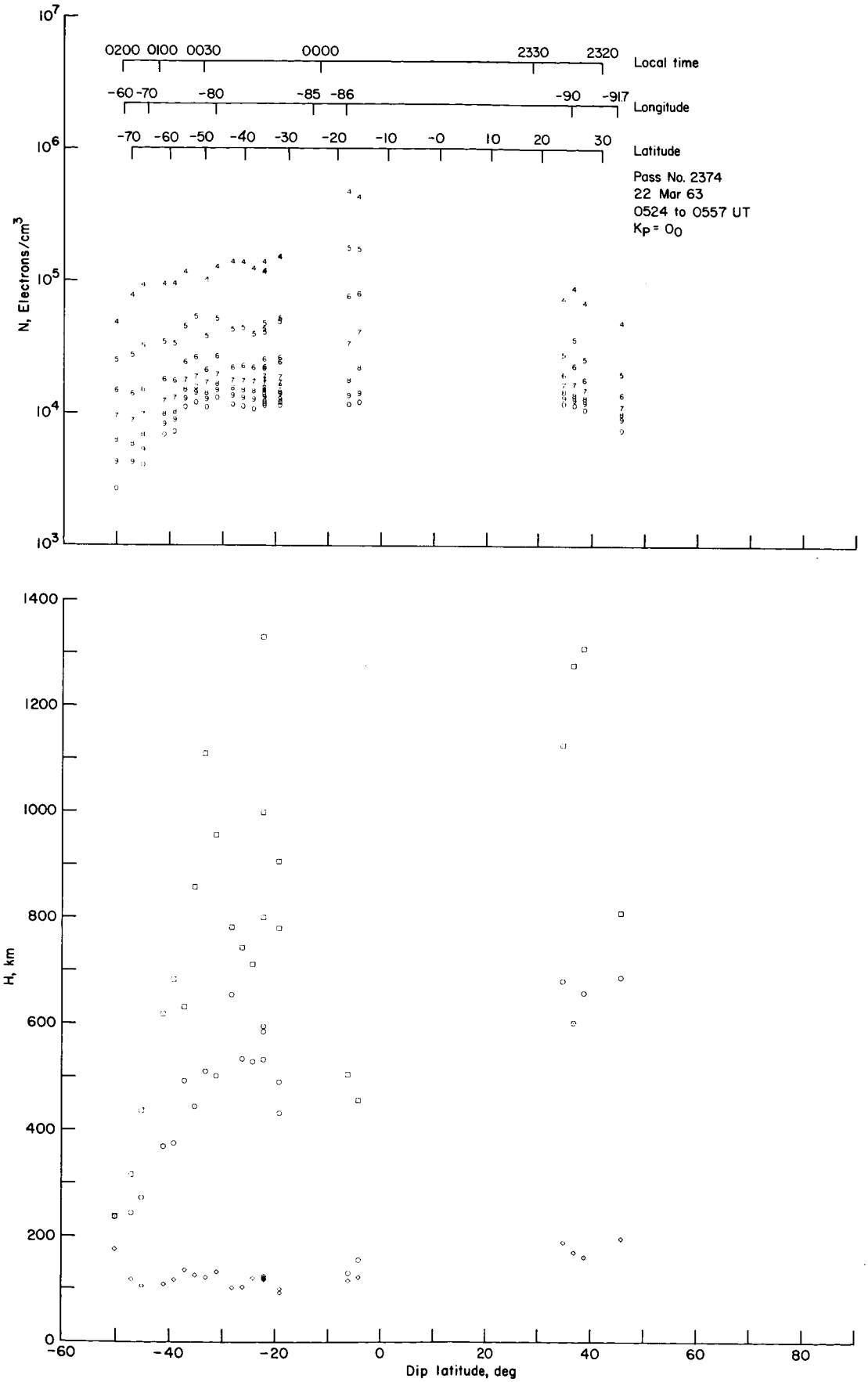

0200 0100 0030 0000 2330 2320
Local time
-60 -70 -80 -85 -86 -90 -91.7
Longitude
-70 -60 -50 -40 -30 -20 -10 -0 10 20 30
Latitude
Pass No. 2374
22 Mar 63
0524 to 0557 UT
Kp = 0o
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 74

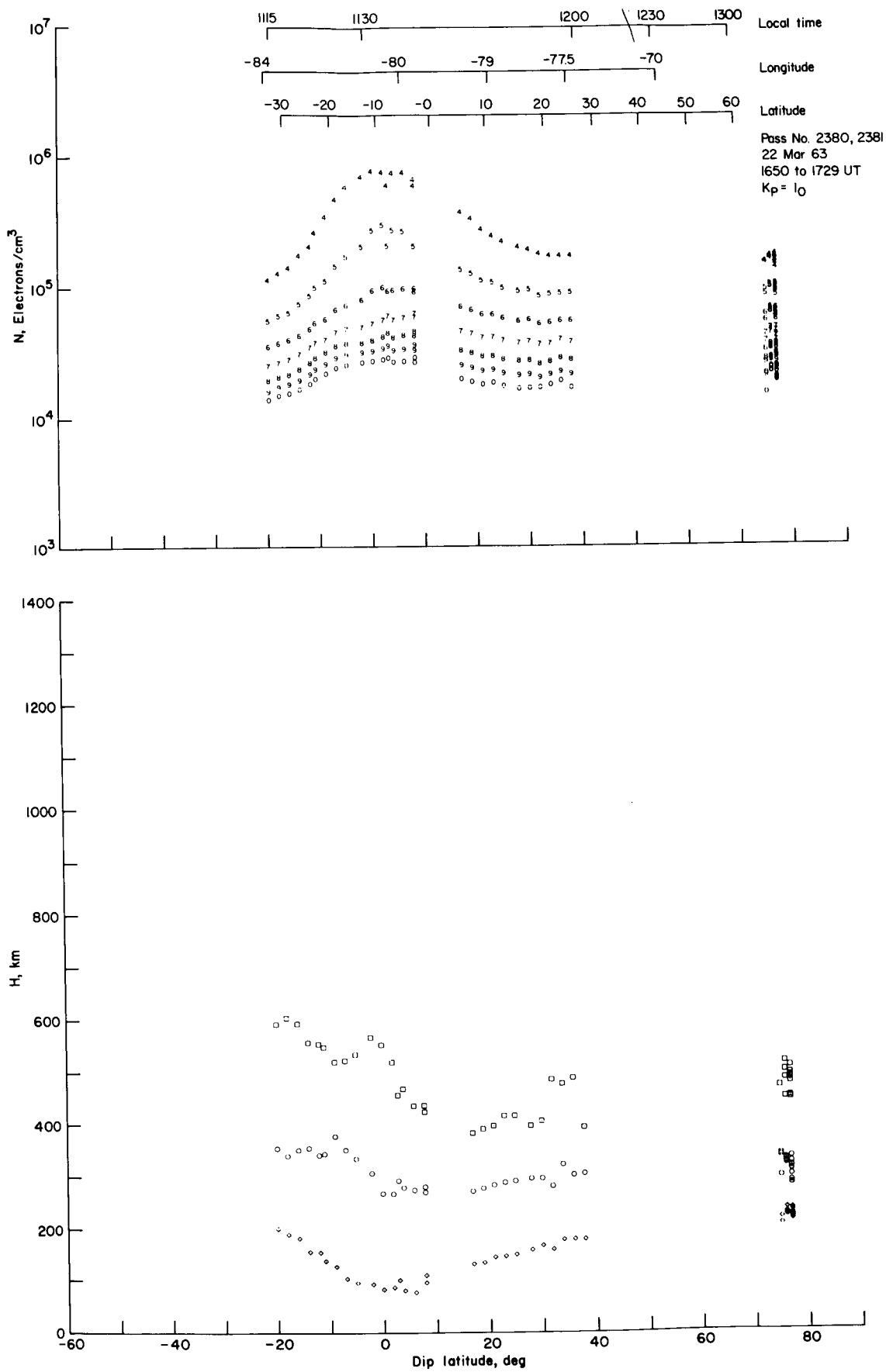

1115
1130
1200
1230
1300
Local time
-84
-80
-79
-77.5
-70
Longitude
-30
-20
-10
-0
10
20
30
40
50
60
Latitude
Pass No. 2380, 2381
22 Mar 63
1650 to 1729 UT
Kp = 1o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 75

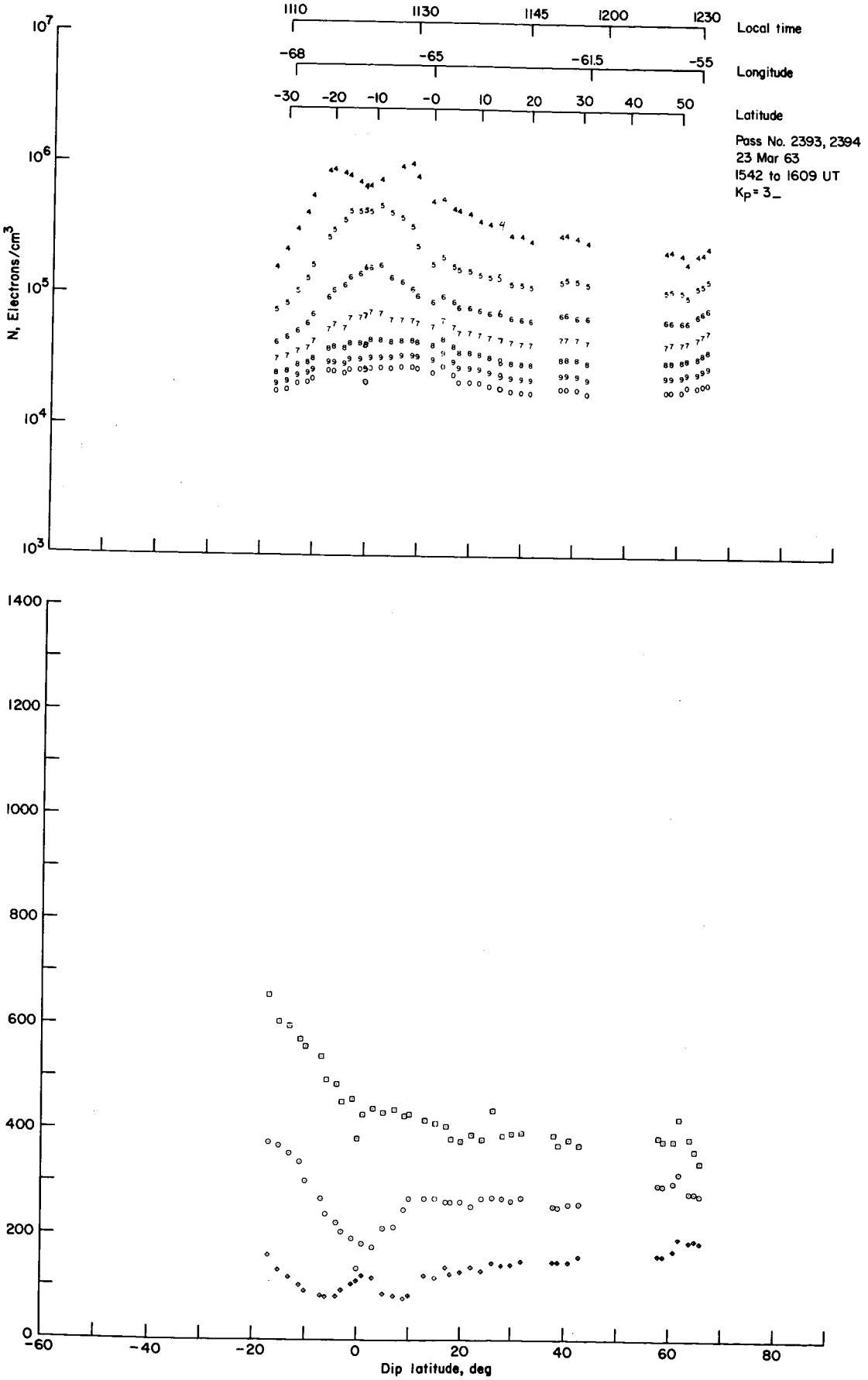

1110
1130
1145
1200
1230
Local time
-68
-65
-61.5
-55
Longitude
-30
-20
-10
-0
10
20
30
40
50
Latitude
Pass No. 2393, 2394
23 Mar 63
1542 to 1609 UT
Kp = 3_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 76

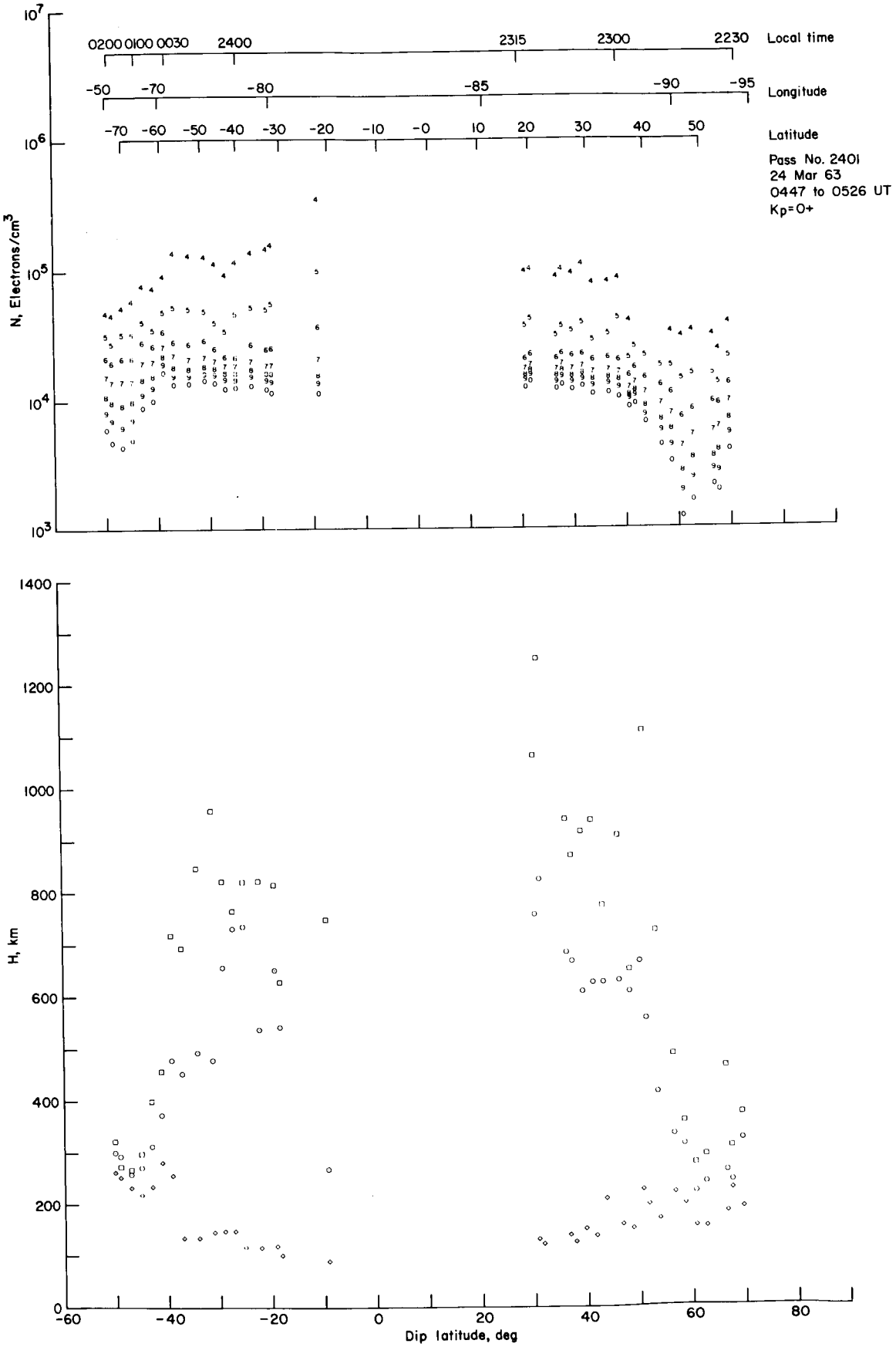

0200 0100 0030
2400
2315
2300
2230
Local time
-50
-70
-80
-85
-90
-95
Longitude
-70 -60 -50 -40 -30 -20 -10 -0 10 20 30 40 50
Latitude
Pass No. 2401
24 Mar 63
0447 to 0526 UT
Kp=0+
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 77

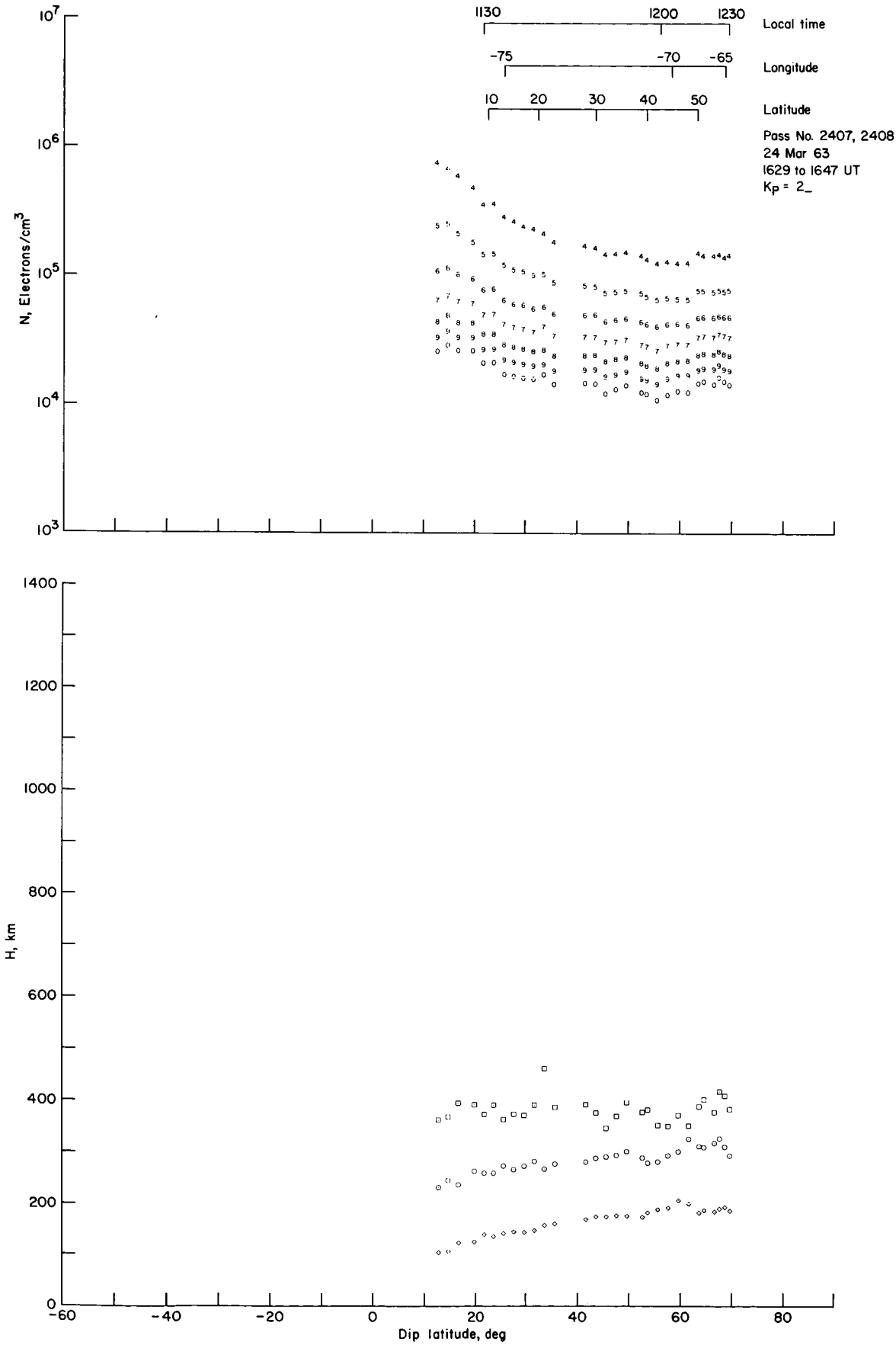

1130
1200
1230
Local time
-75
-70
-65
Longitude
10
20
30
40
50
Latitude
Pass No. 2407, 2408
24 Mar 63
1629 to 1647 UT
Kp = 2_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 78

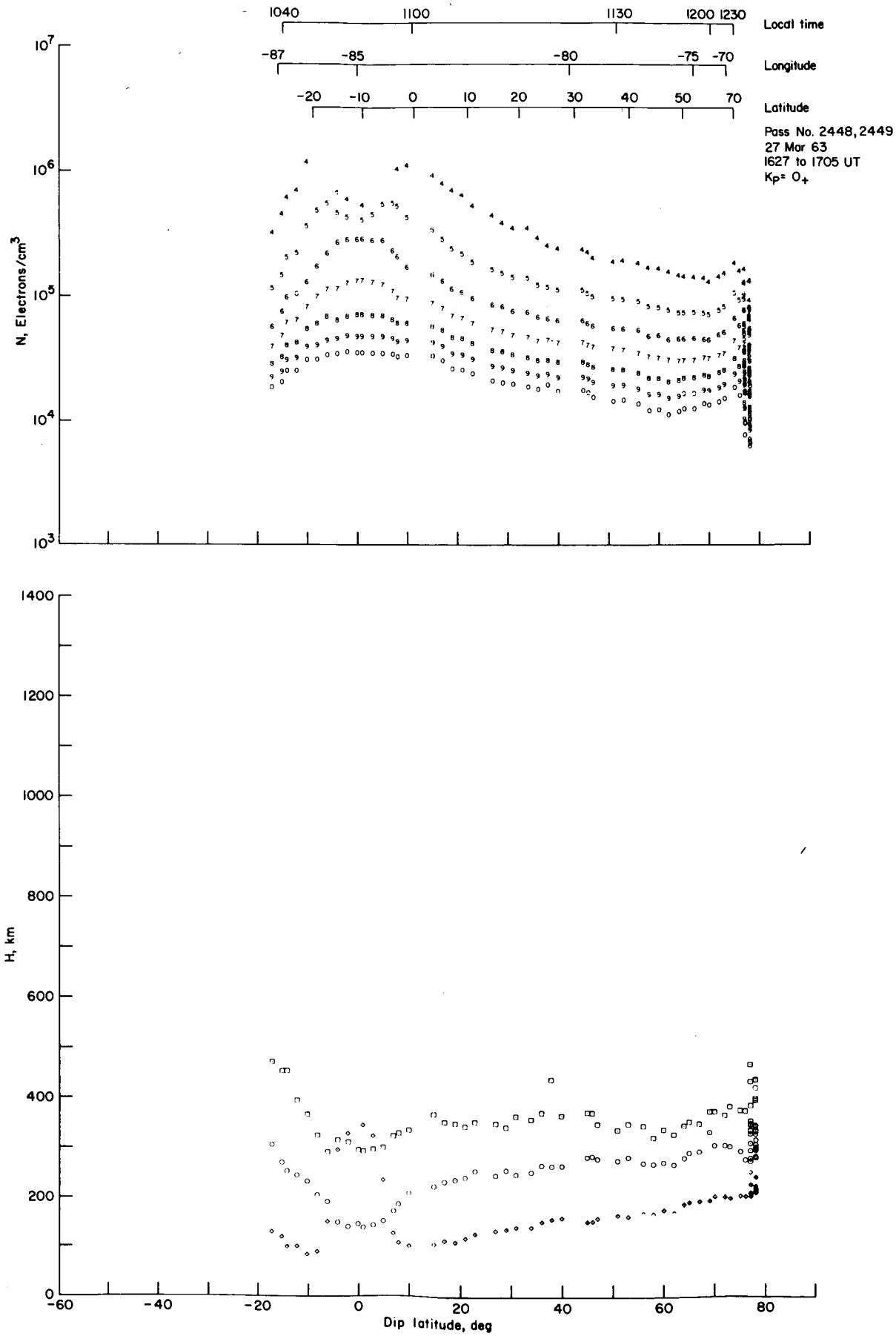

1040
1100
1130
1200 1230
Local time
-87
-85
-80
-75 -70
Longitude
-20 -10 0 10 20 30 40 50 70
Latitude
Pass No. 2448, 2449
27 Mar 63
1627 to 1705 UT
Kp= 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 79

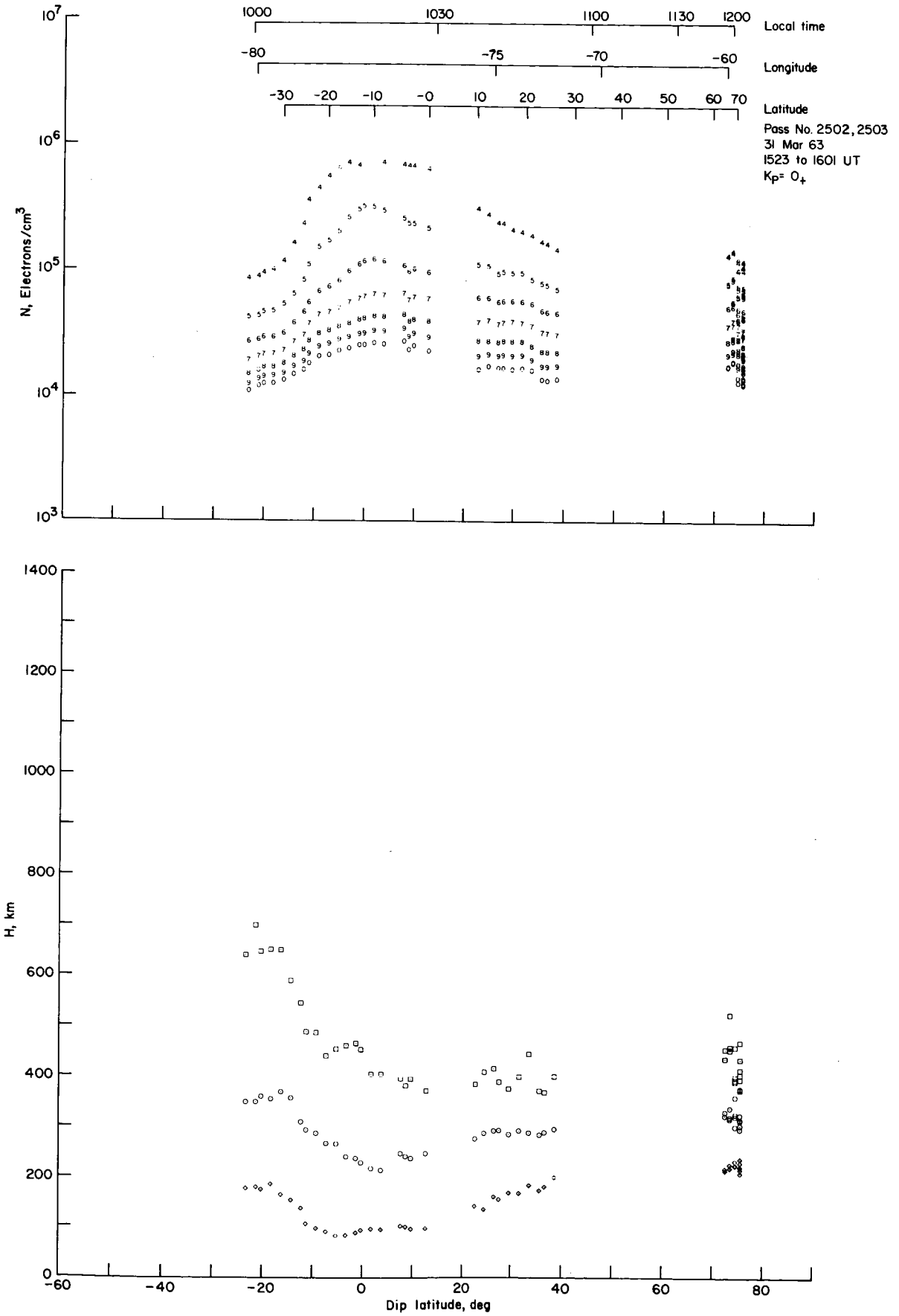

1000
1030
1100
1130
1200
Local time
-80
-75
-70
-60
Longitude
-30 -20 -10 -0 10 20 30 40 50 60 70
Latitude
Pass No. 2502, 2503
31 Mar 63
1523 to 1601 UT
Kp= 0+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 80

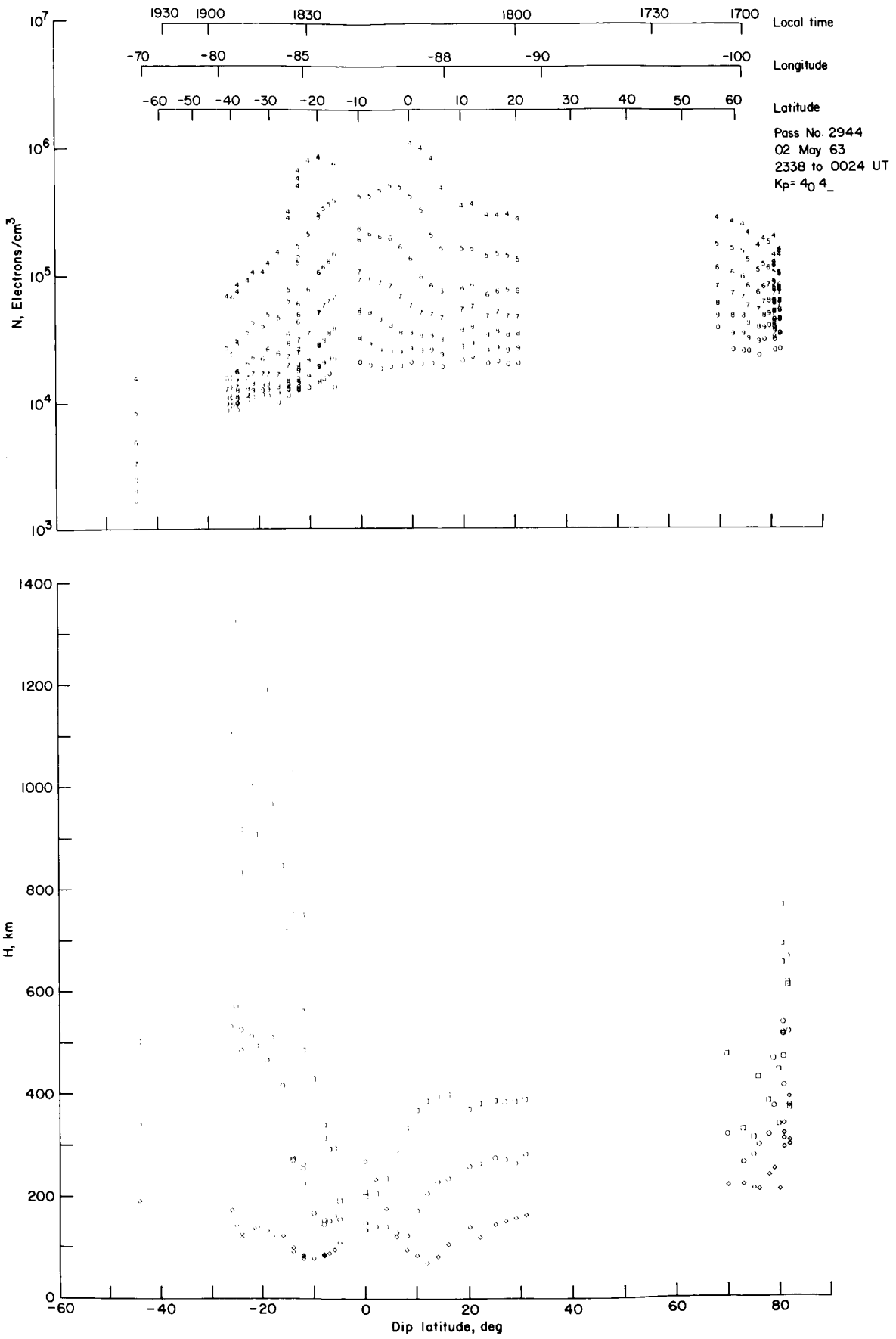

1930 1900 1830 1800 1730 1700
Local time
-70 -80 -85 -88 -90 -100
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2944
02 May 63
2338 to 0024 UT
Kp= 4₀ 4_
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 81

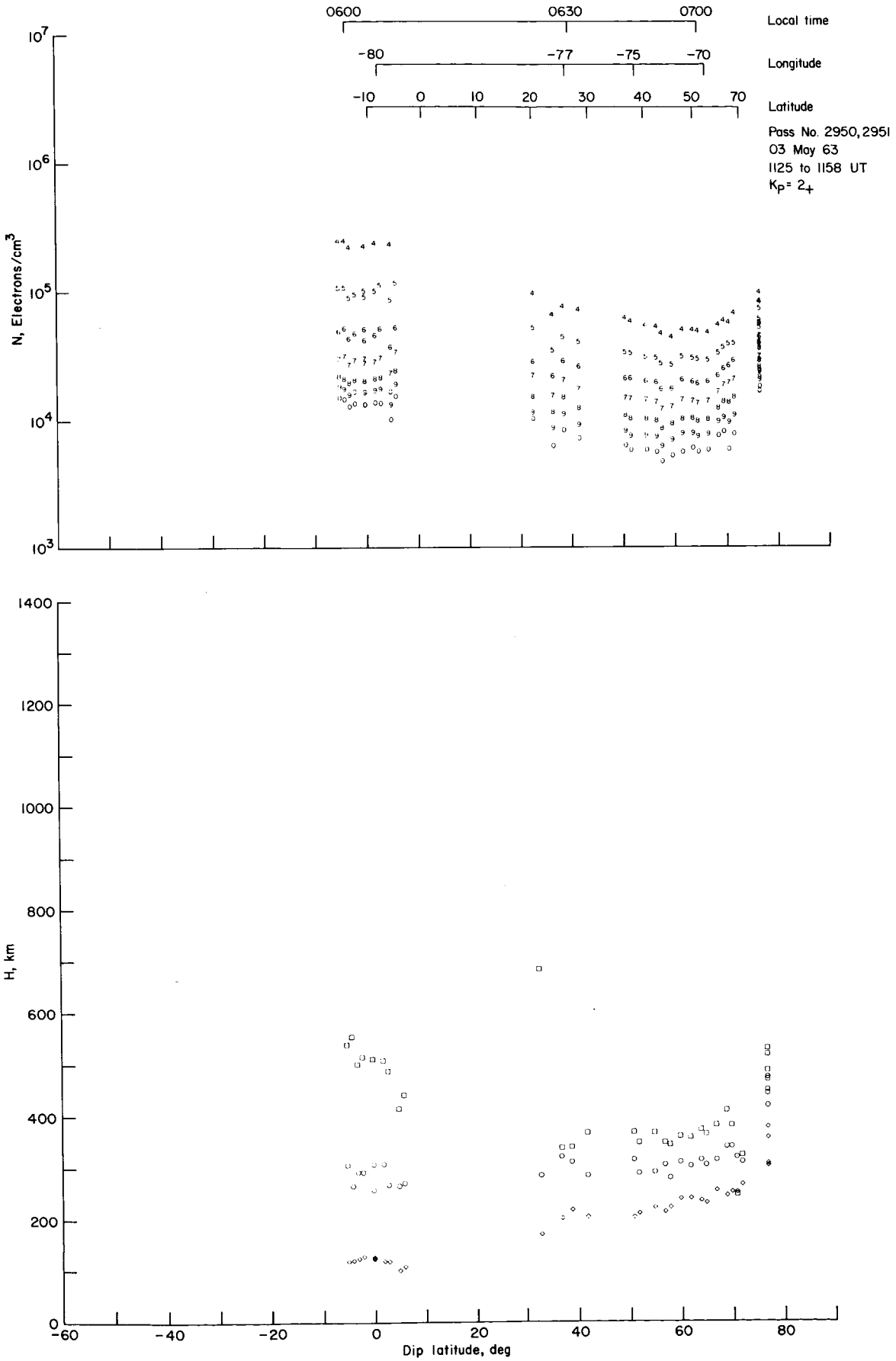
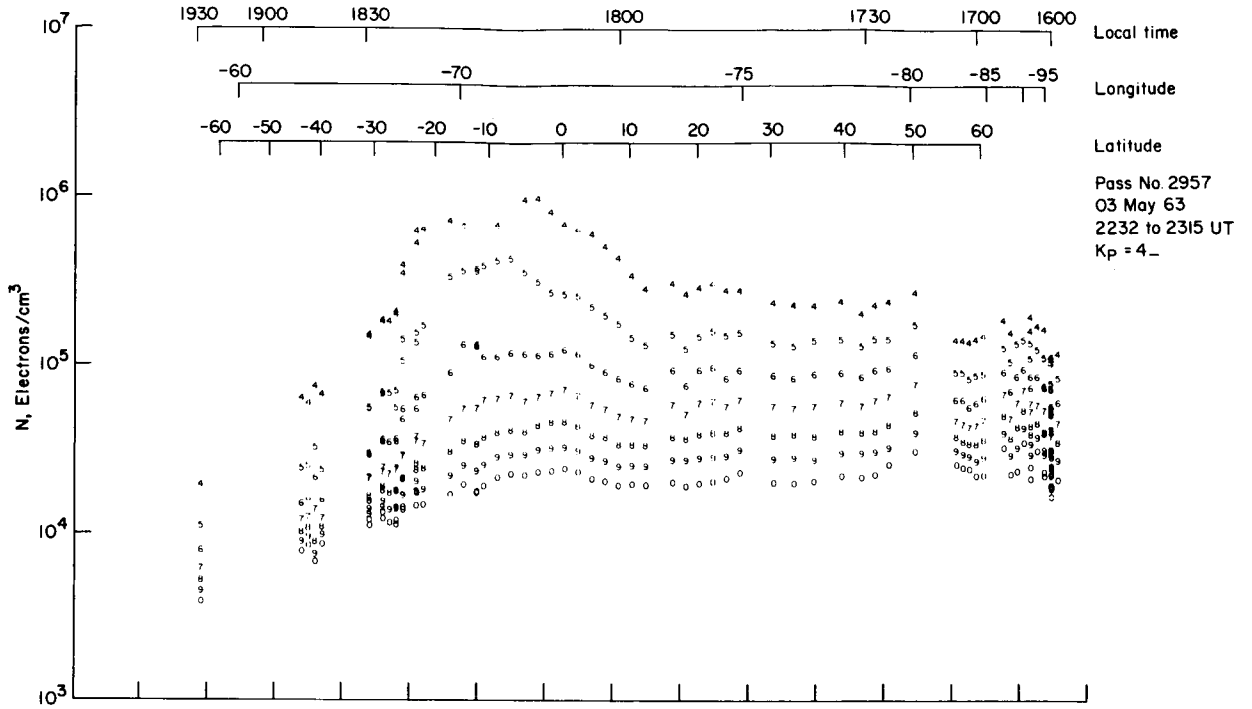

0600
0630
0700
Local time
-80
-77
-75
-70
Longitude
-10
0
10
20
30
40
50
70
Latitude
Pass No. 2950, 2951
03 May 63
1125 to 1158 UT
Kp= 2+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 82


1930 1900 1830 1800 1730 1700 1600
Local time
-60 -70 -75 -80 -85 -95
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 2957
03 May 63
2232 to 2315 UT
Kp = 4-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

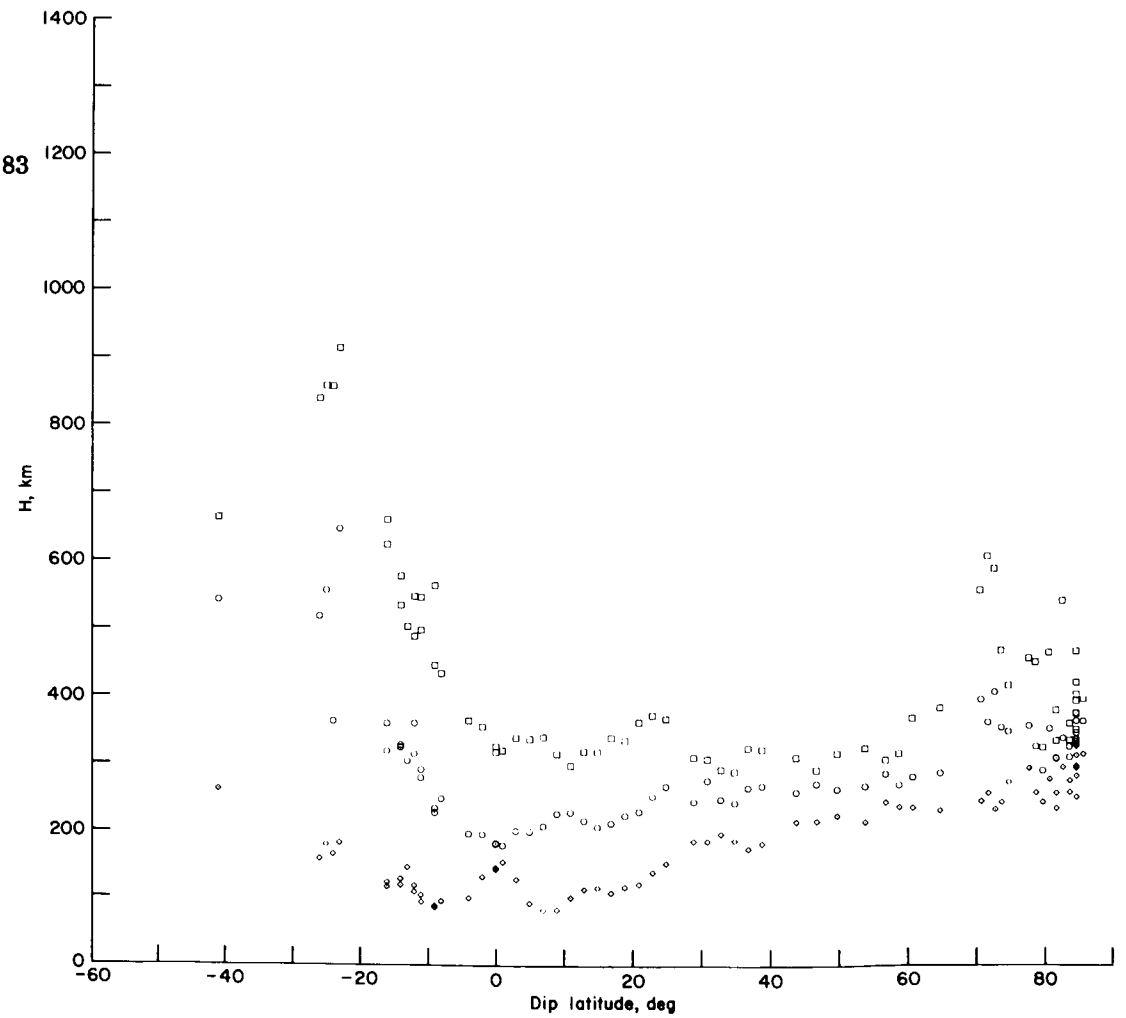

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 83

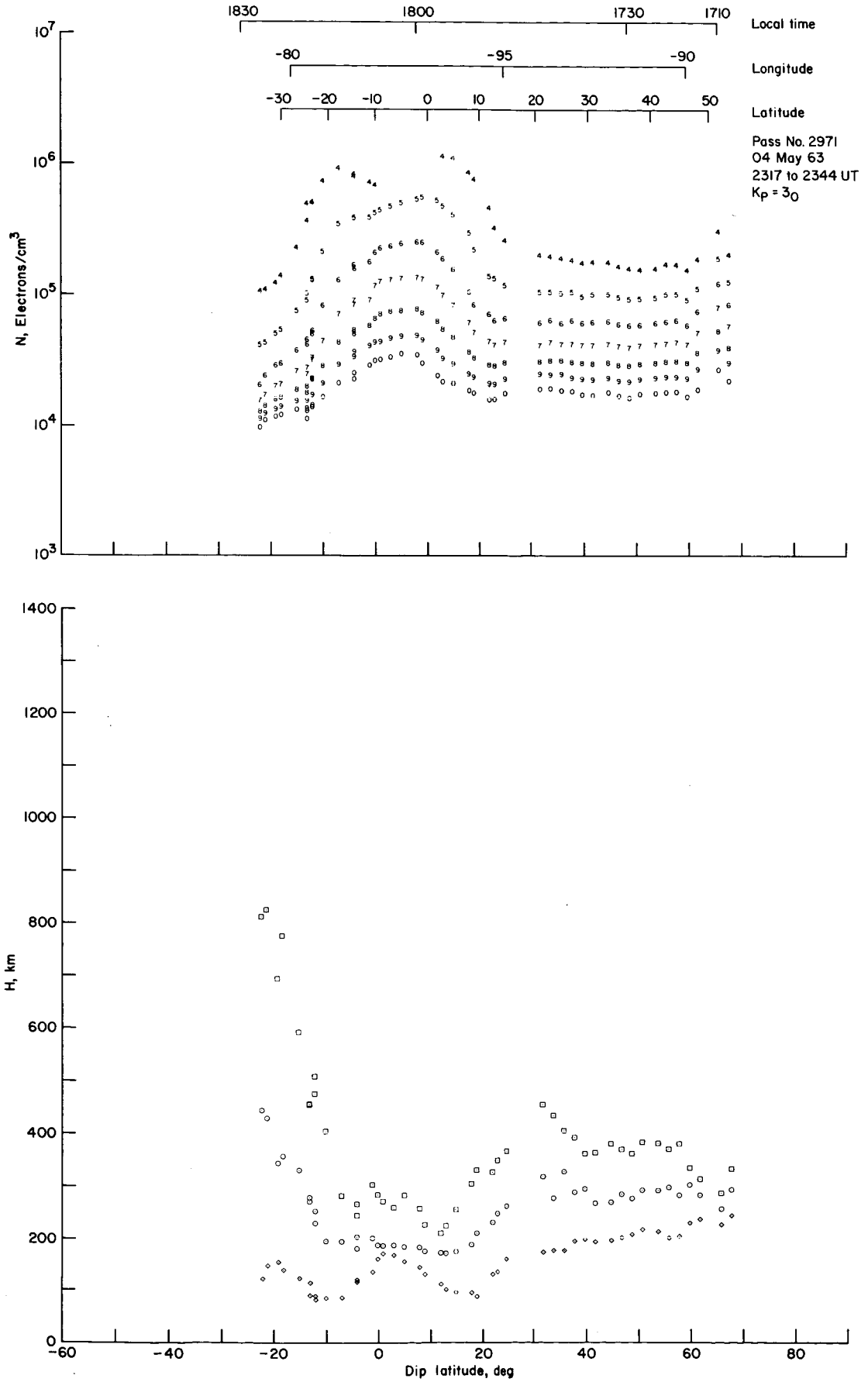

1830
1800
1730
1710
Local time
-80
-95
-90
Longitude
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 2971
04 May 63
2317 to 2344 UT
$K_p = 3_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 84

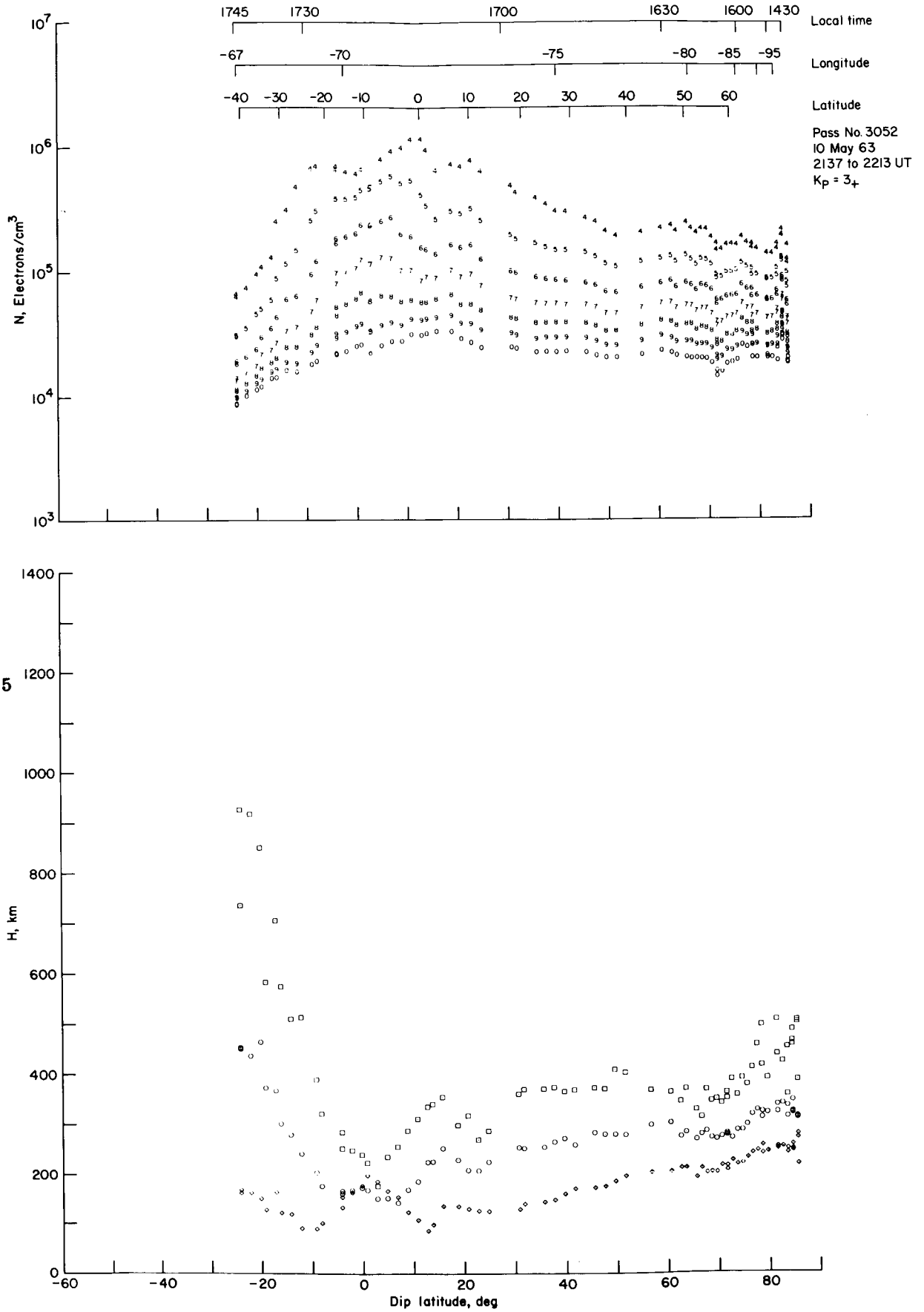

1745
1730
1700
1630
1600
1430
Local time
-67
-70
-75
-80
-85
-95
Longitude
-40
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3052
10 May 63
2137 to 2213 UT
$K_P = 3_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 85

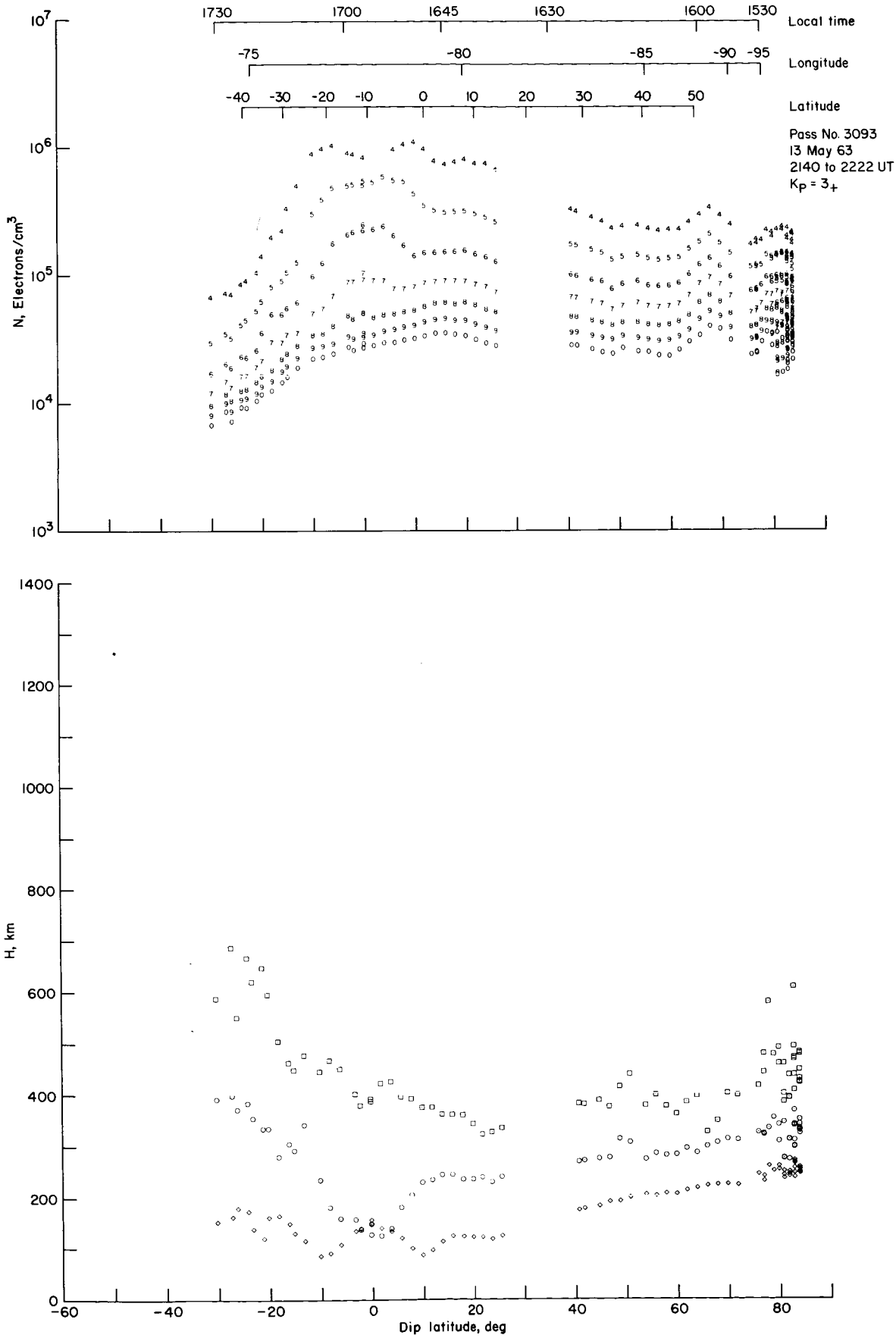

1730
1700
1645
1630
1600
1530
Local time
-75
-80
-85
-90
-95
Longitude
-40
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3093
13 May 63
2140 to 2222 UT
$K_P = 3_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 86

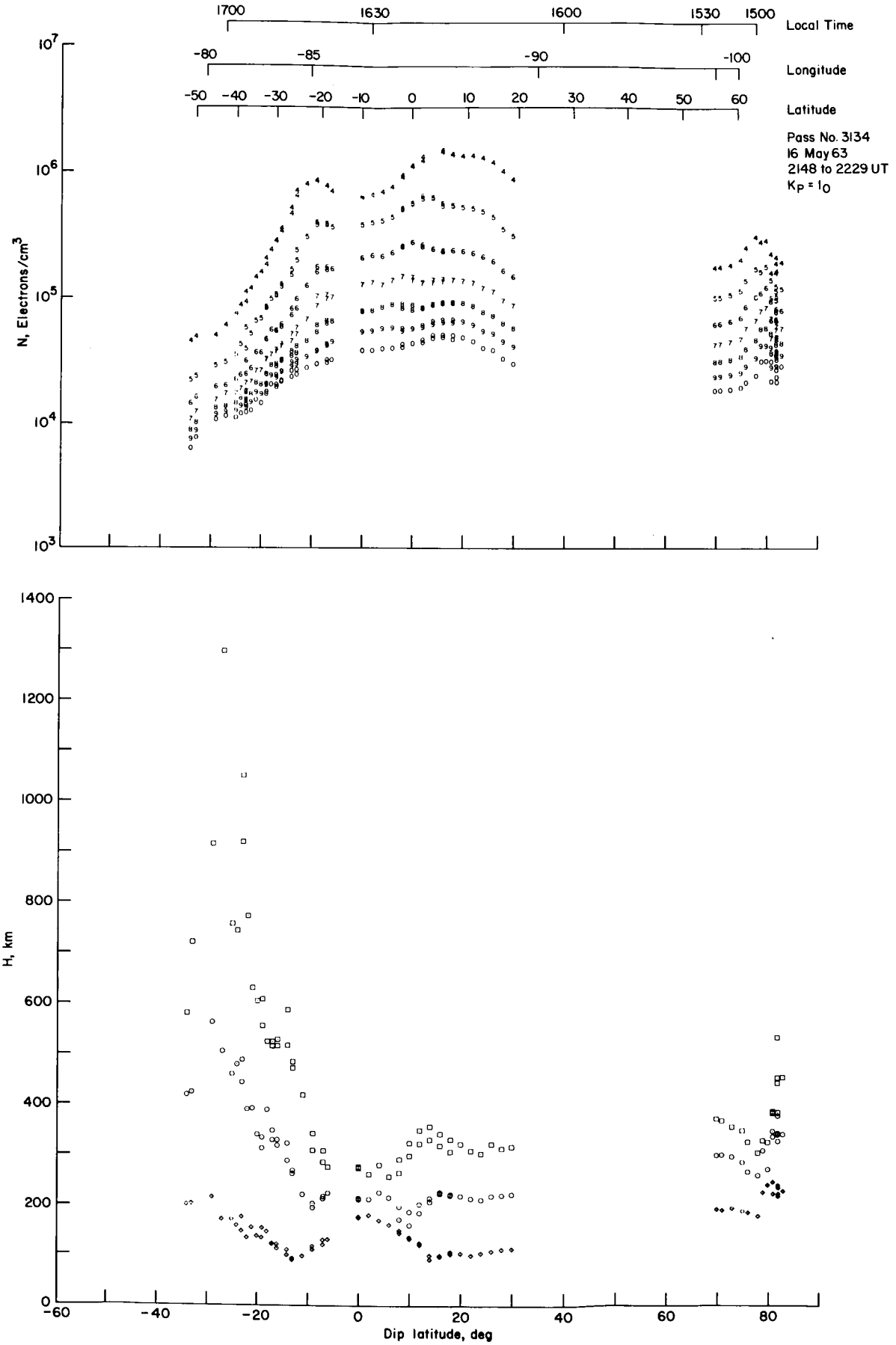

1700
1630
1600
1530
1500
Local Time
-80
-85
-90
-100
Longitude
-50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3134
16 May 63
2148 to 2229 UT
Kp = 1o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 87

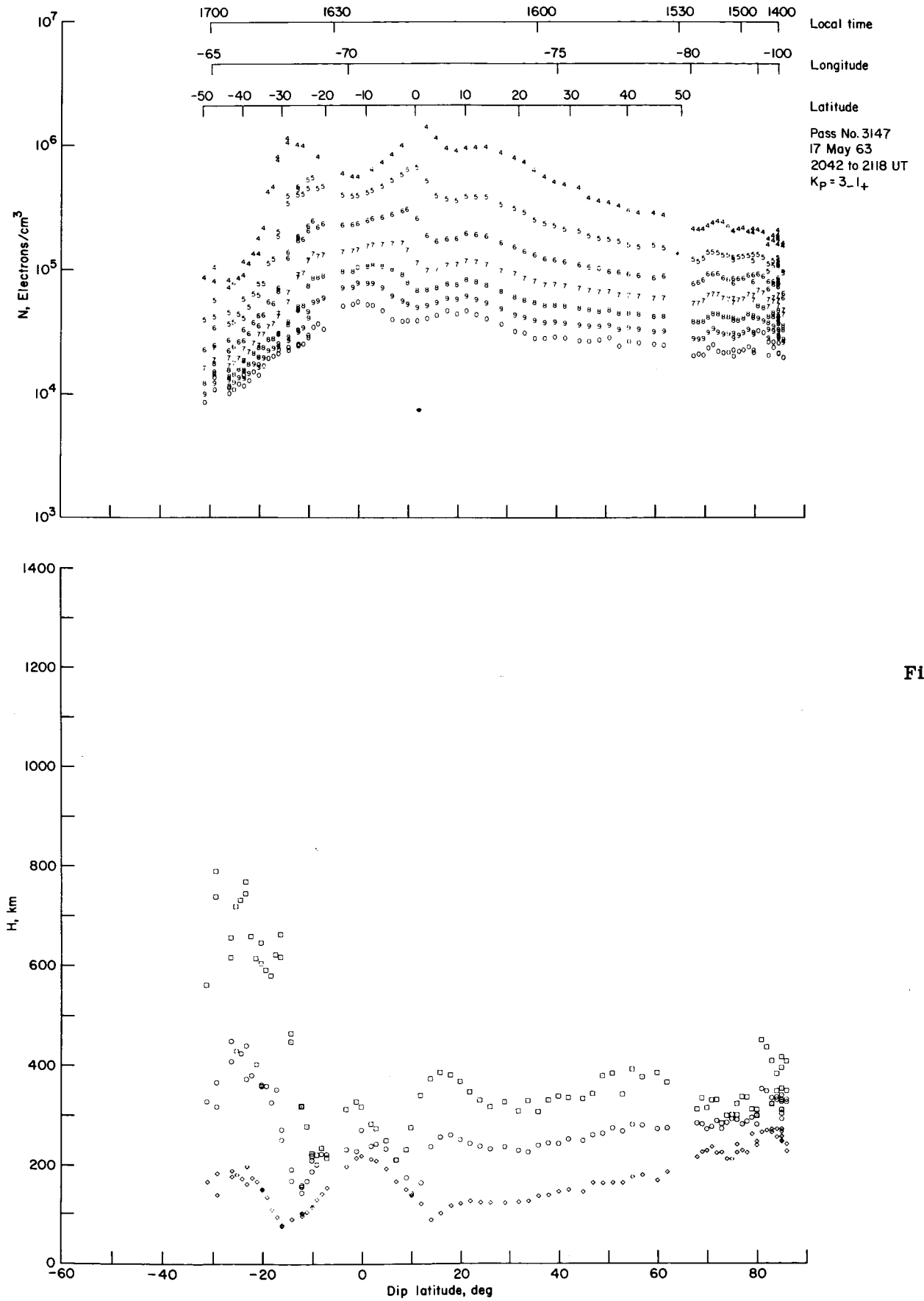

1700
1630
1600
1530
1500
1400
Local time
-65
-70
-75
-80
-100
Longitude
-50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 3147
17 May 63
2042 to 2118 UT
$K_p = 3_-1_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 88

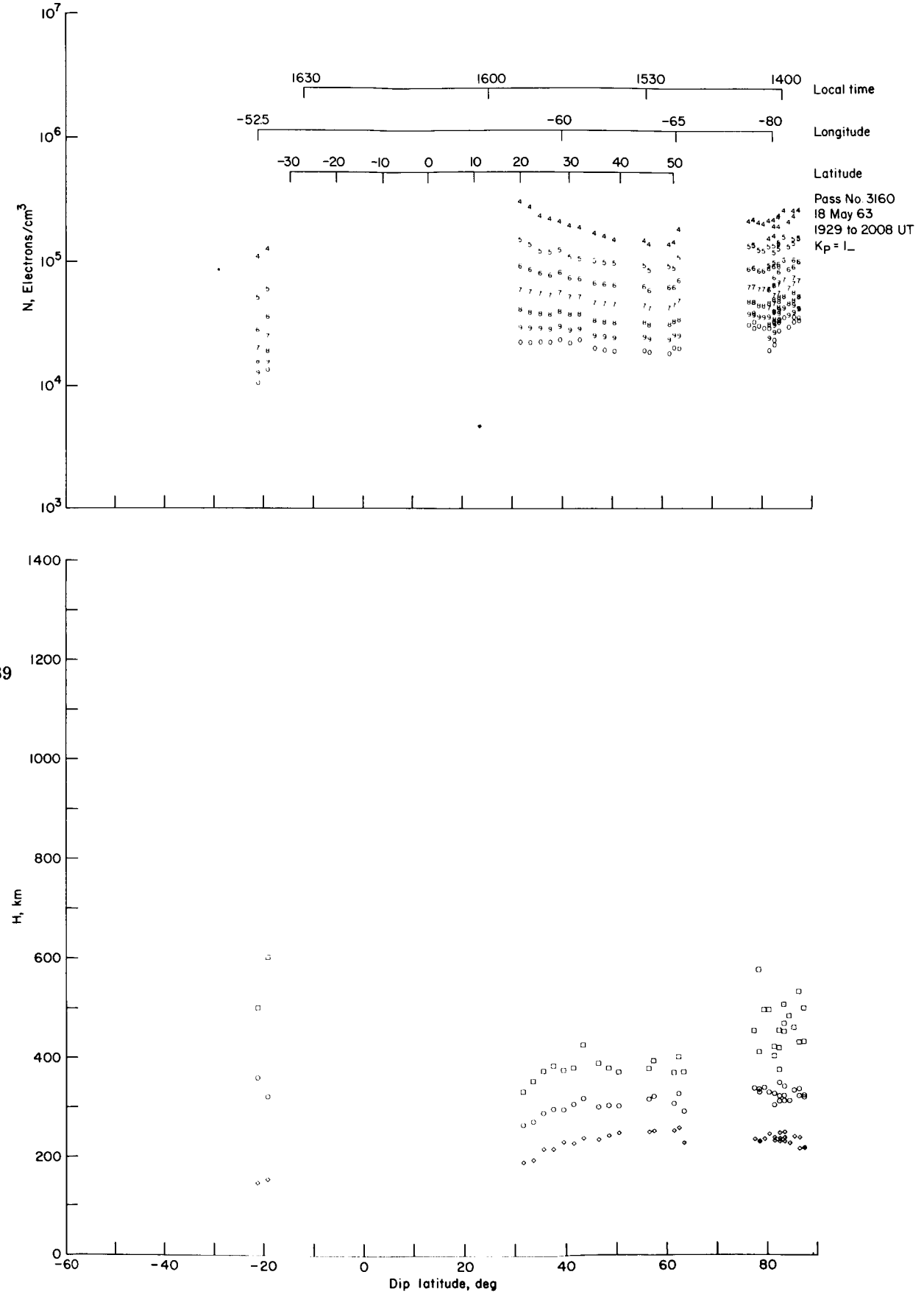

10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1630
1600
1530
1400
Local time
-52.5
-60
-65
-80
Longitude
-30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 3160
18 May 63
1929 to 2008 UT
Kp = 1_
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 89

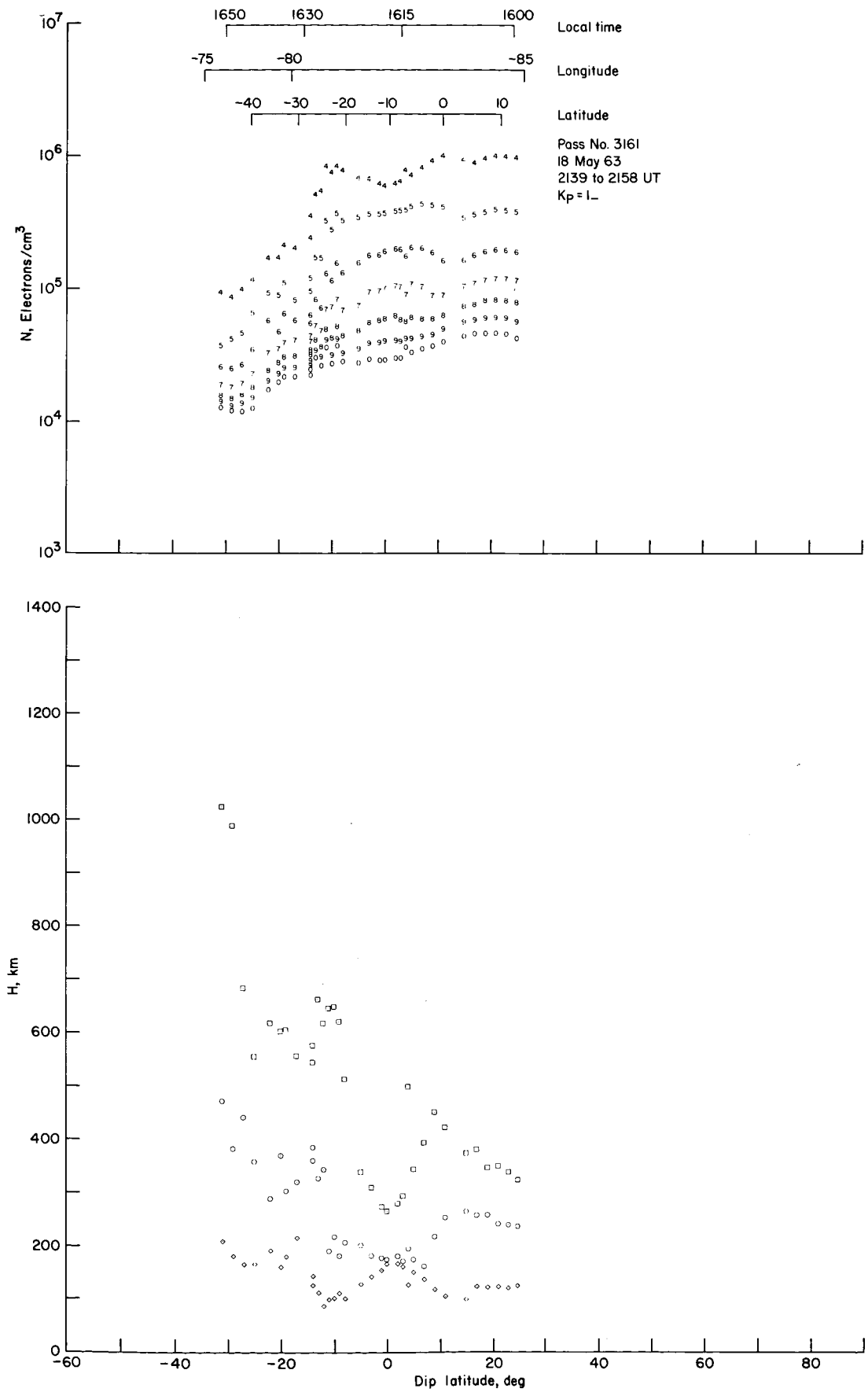

1650
1630
1615
1600
Local time
-75
-80
-85
Longitude
-40
-30
-20
-10
0
10
Latitude
Pass No. 3161
18 May 63
2139 to 2158 UT
Kp = 1-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 90

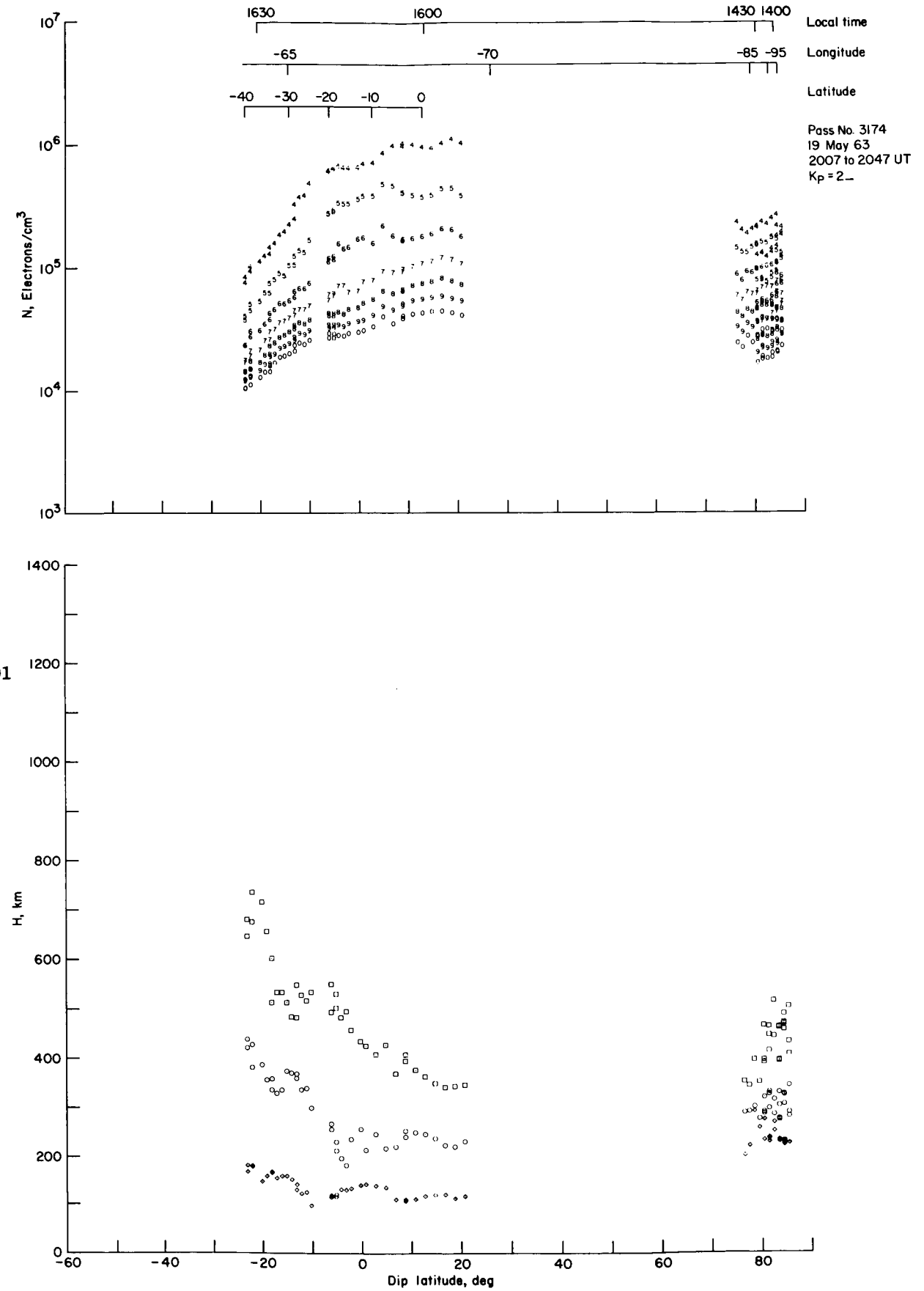

1630
1600
1430 1400
Local time
-65
-70
-85 -95
Longitude
-40 -30 -20 -10 0
Latitude
Pass No. 3174
19 May 63
2007 to 2047 UT
Kp = 2-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 91

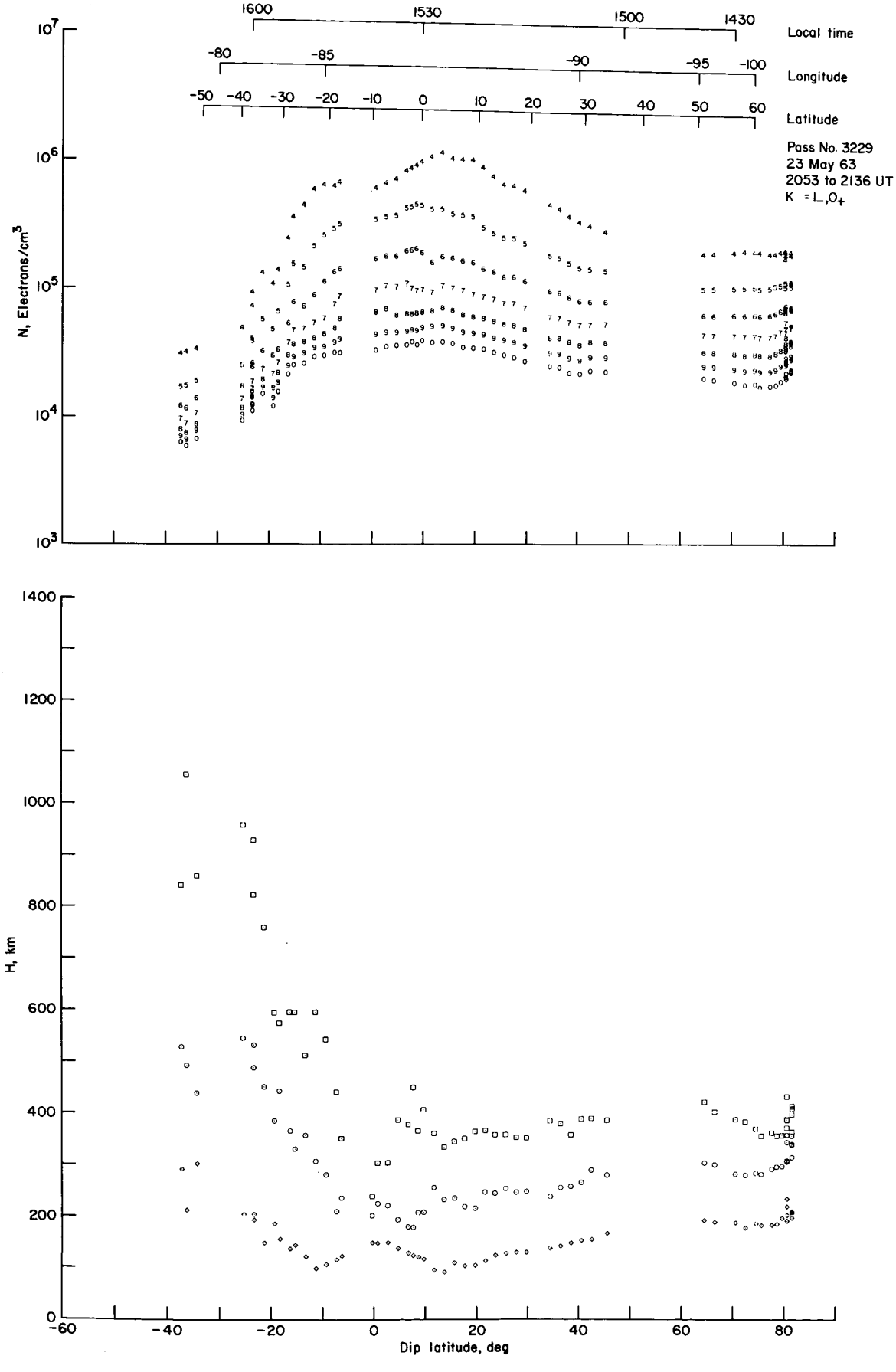

1600
1530
1500
1430
Local time
-80
-85
-90
-95
-100
Longitude
-50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3229
23 May 63
2053 to 2136 UT
K = L-,O+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 92

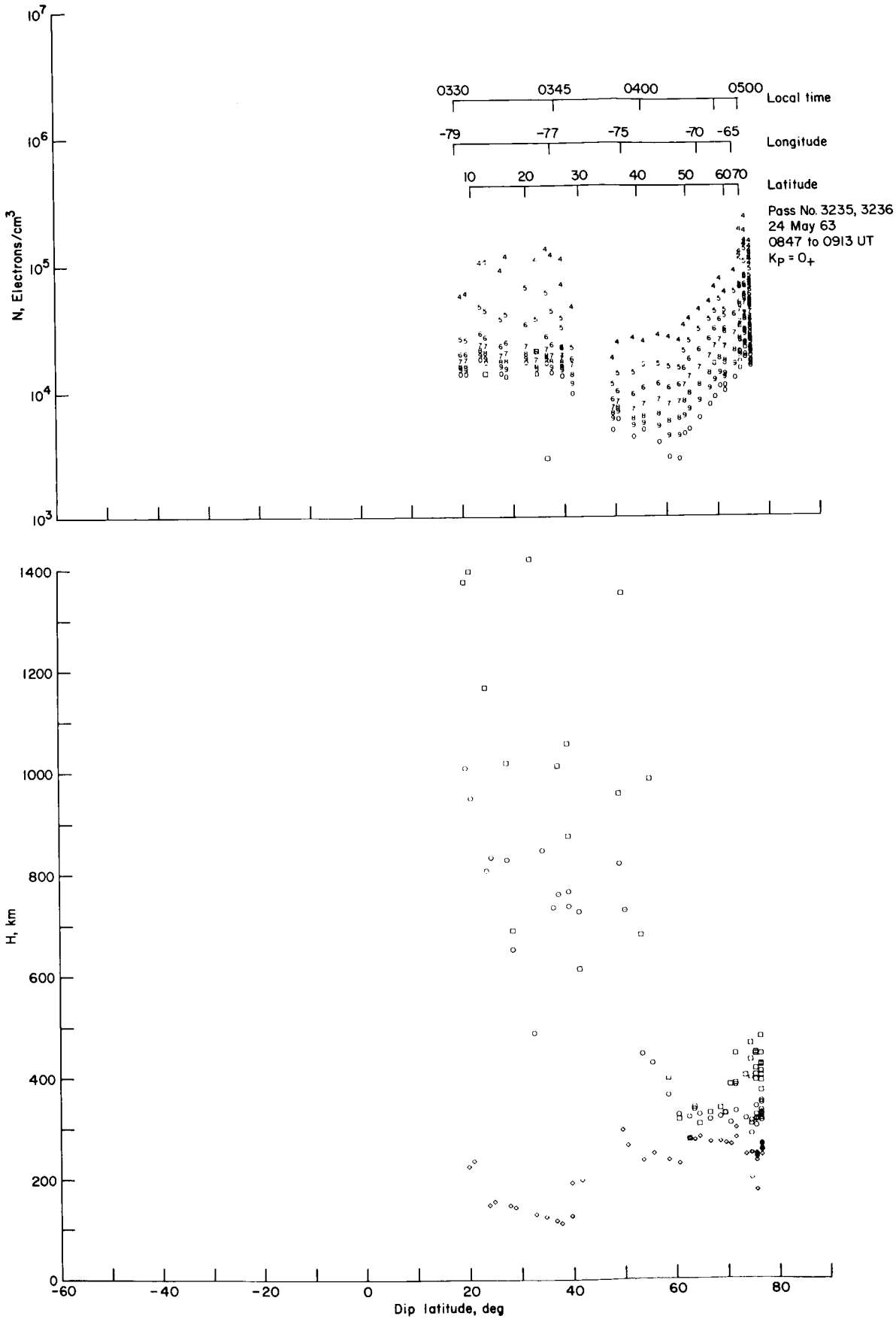

10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
0330
0345
0400
0500
Local time
-79
-77
-75
-70
-65
Longitude
10
20
30
40
50
60
70
Latitude
Pass No. 3235, 3236
24 May 63
0847 to 0913 UT
$K_P = O_+$
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 93

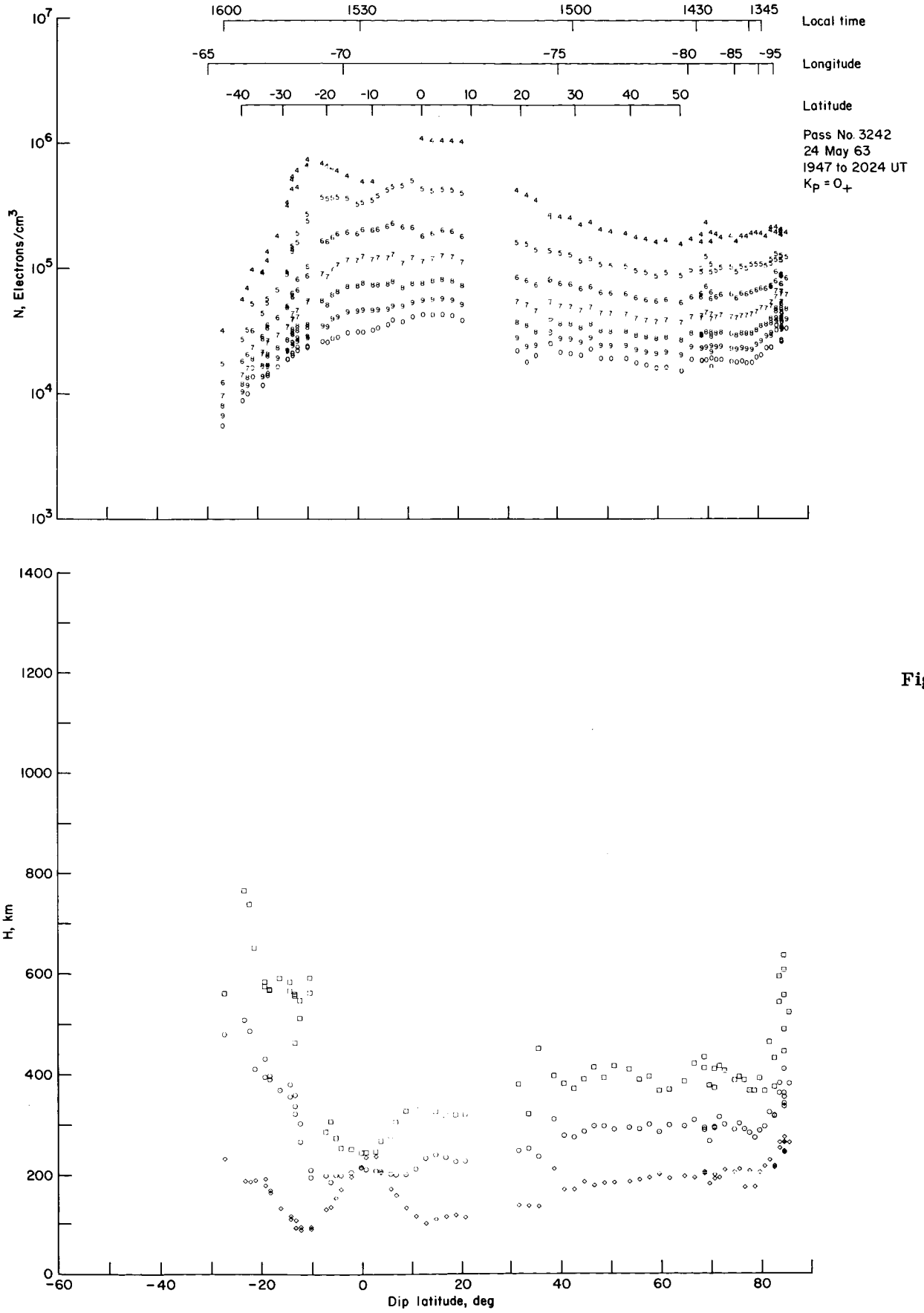

1600
1530
1500
1430
1345
Local time
-65
-70
-75
-80
-85
-95
Longitude
-40
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3242
24 May 63
1947 to 2024 UT
$K_P = 0_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 94

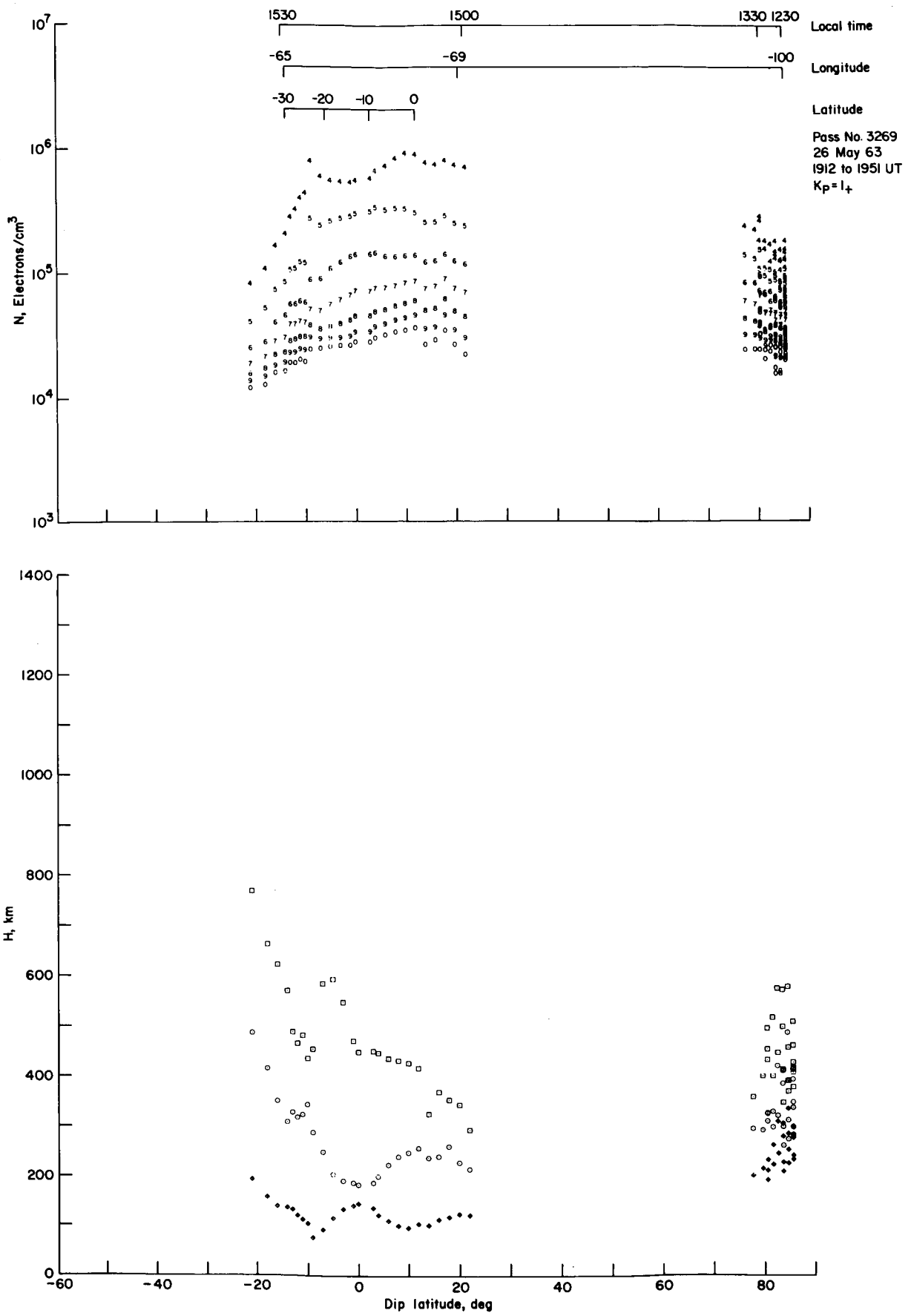

1530
1500
1330 1230
Local time
-65
-69
-100
Longitude
-30 -20 -10 0
Latitude
Pass No. 3269
26 May 63
1912 to 1951 UT
$K_p = 1_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 95

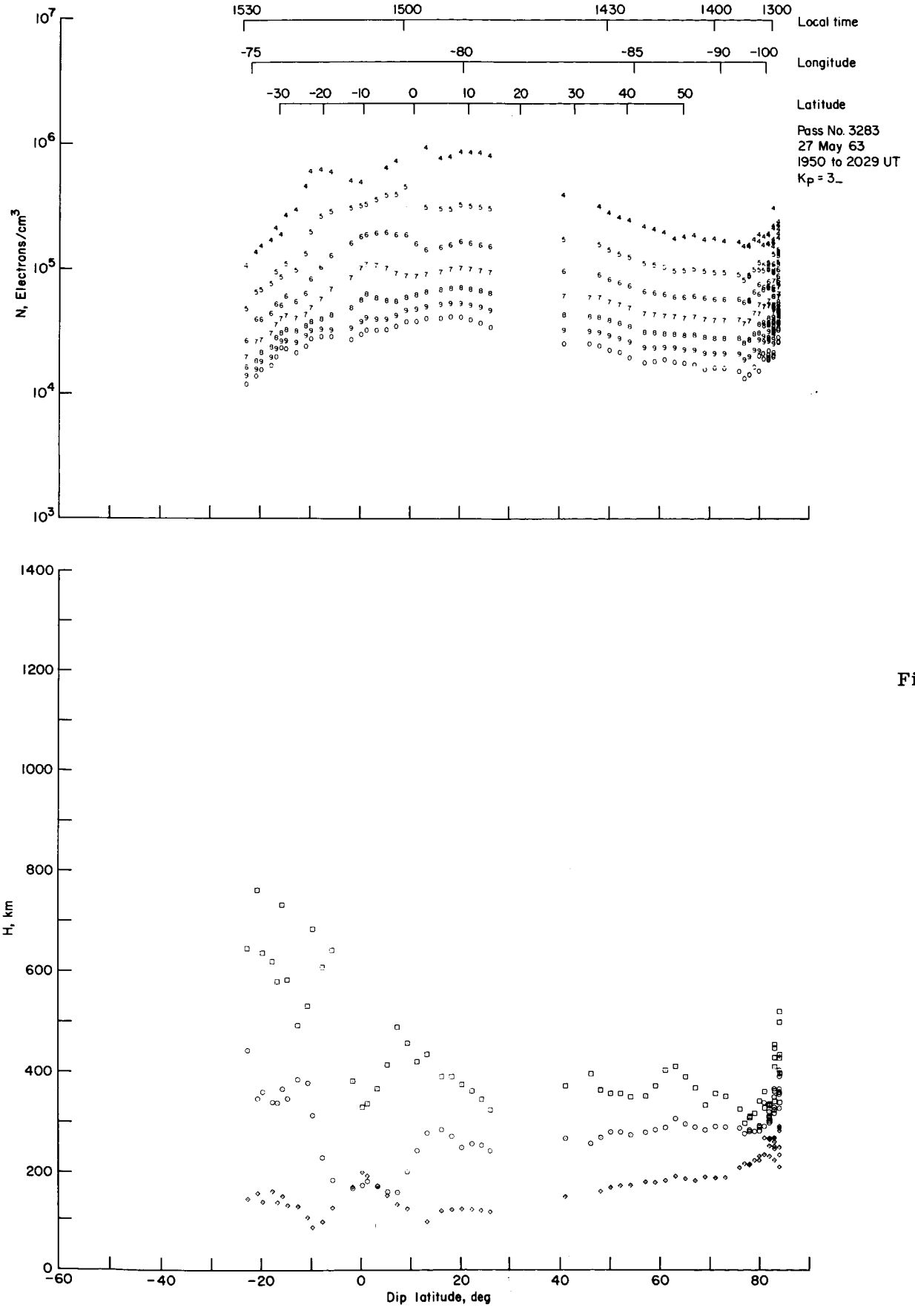

1530
1500
1430
1400
1300
Local time
-75
-80
-85
-90
-100
Longitude
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3283
27 May 63
1950 to 2029 UT
Kp = 3_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 96

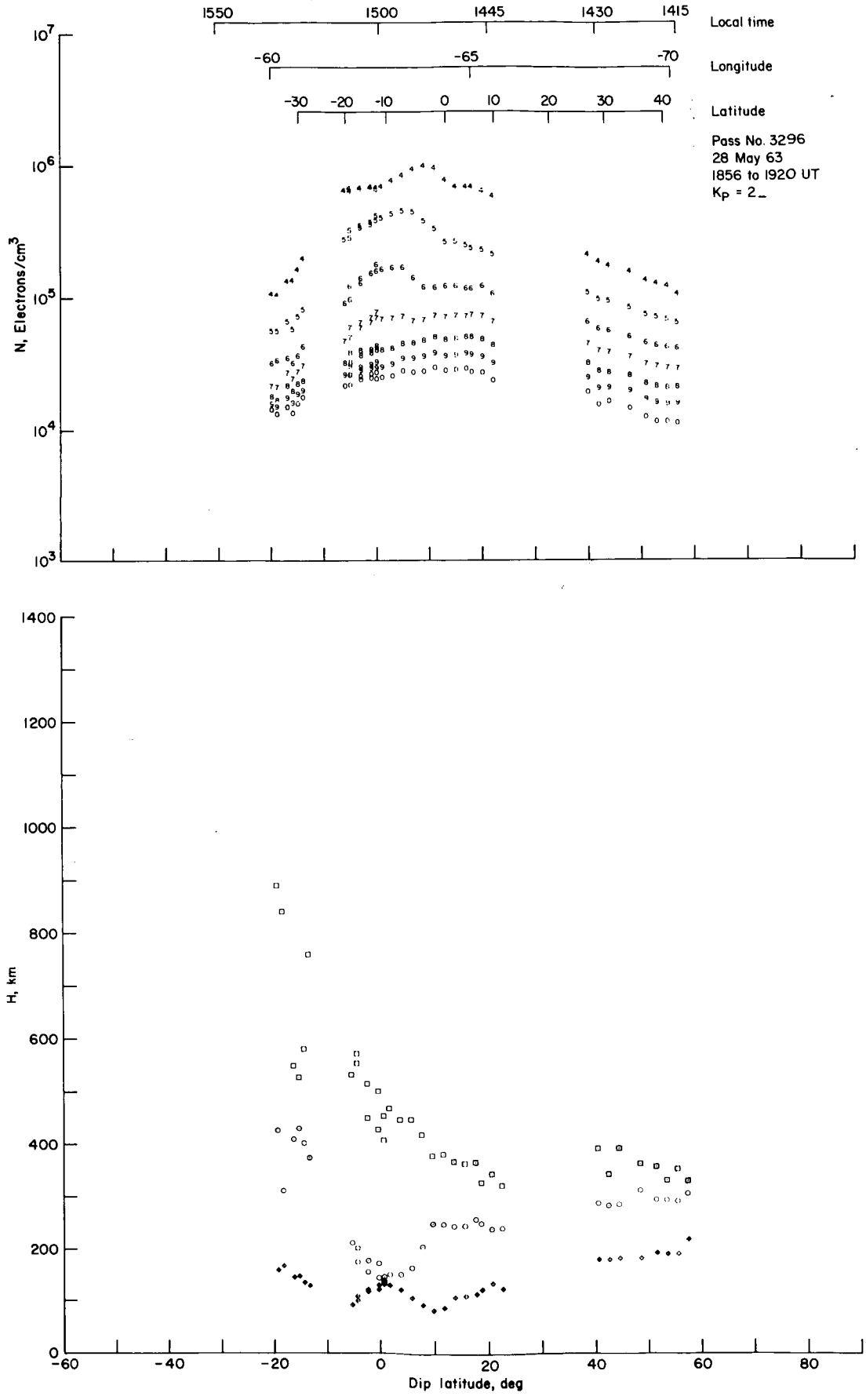

1550
1500
1445
1430
1415
Local time
-60
-65
-70
Longitude
-30
-20
-10
0
10
20
30
40
Latitude
Pass No. 3296
28 May 63
1856 to 1920 UT
K_P = 2-
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 97

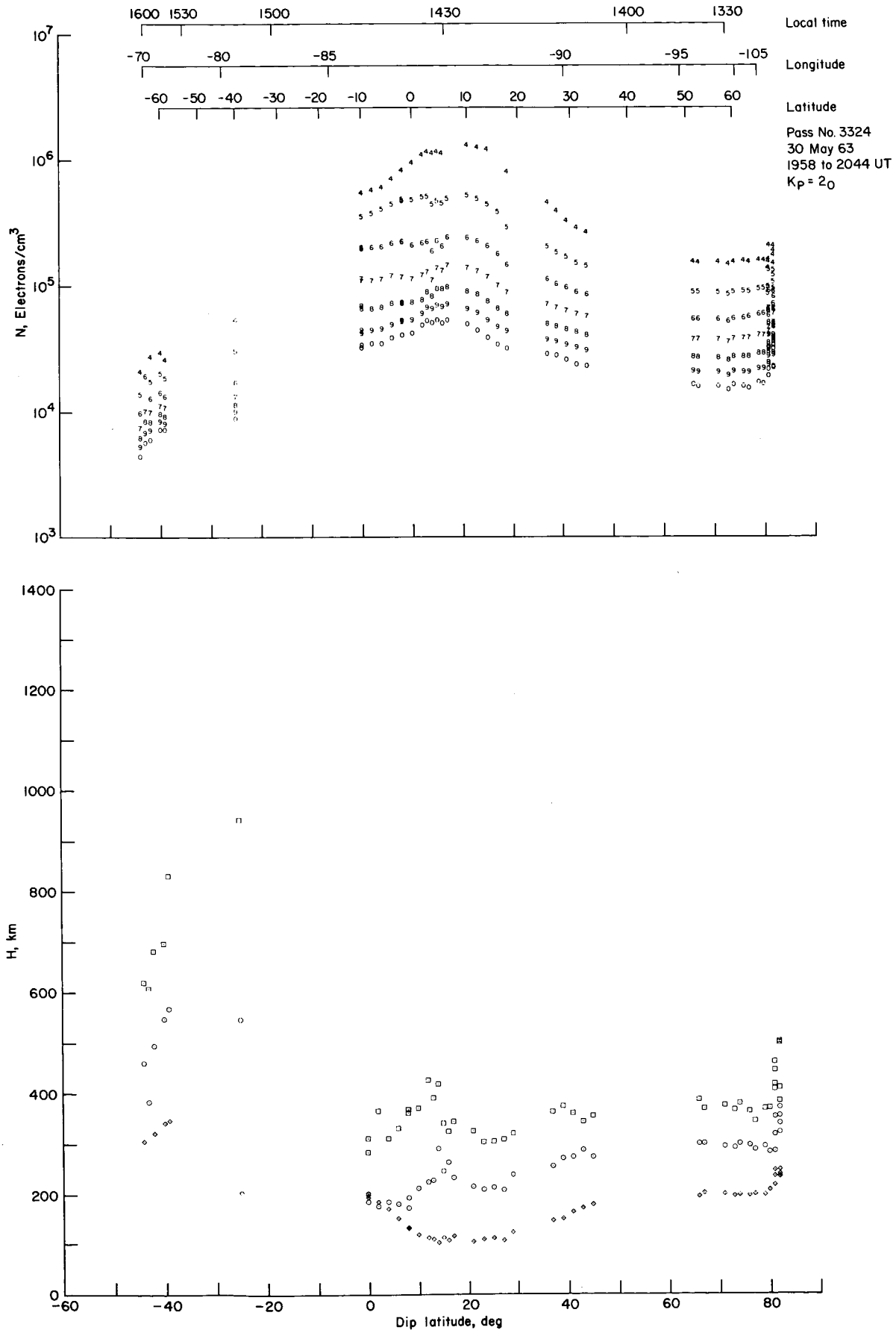

1600 1530 1500 1430 1400 1330
Local time
-70 -80 -85 -90 -95 -105
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3324
30 May 63
1958 to 2044 UT
$K_P = 2_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 98

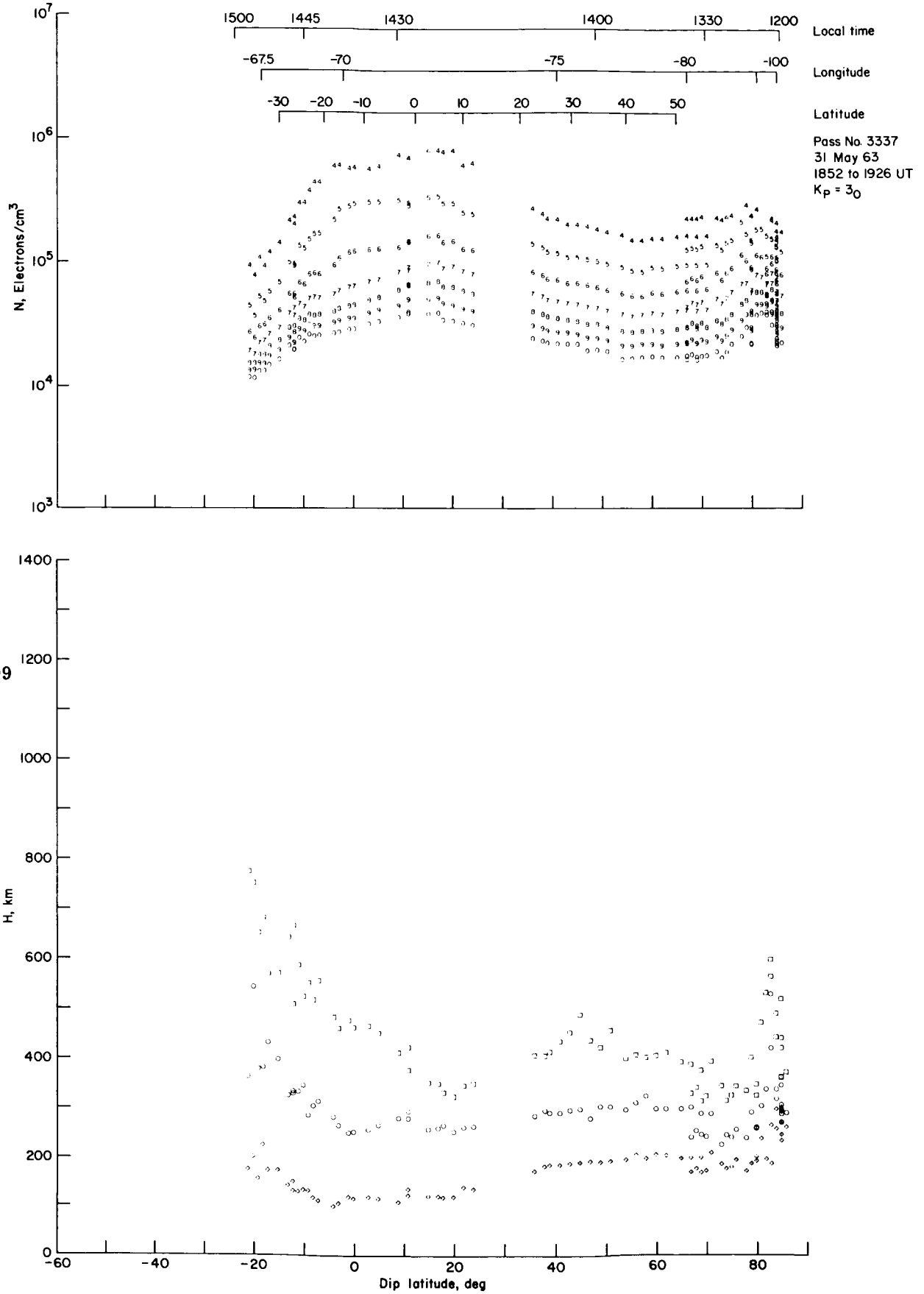

1500
1445
1430
1400
1330
1200
Local time
-67.5
-70
-75
-80
-100
Longitude
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3337
31 May 63
1852 to 1926 UT
$K_P = 3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 99

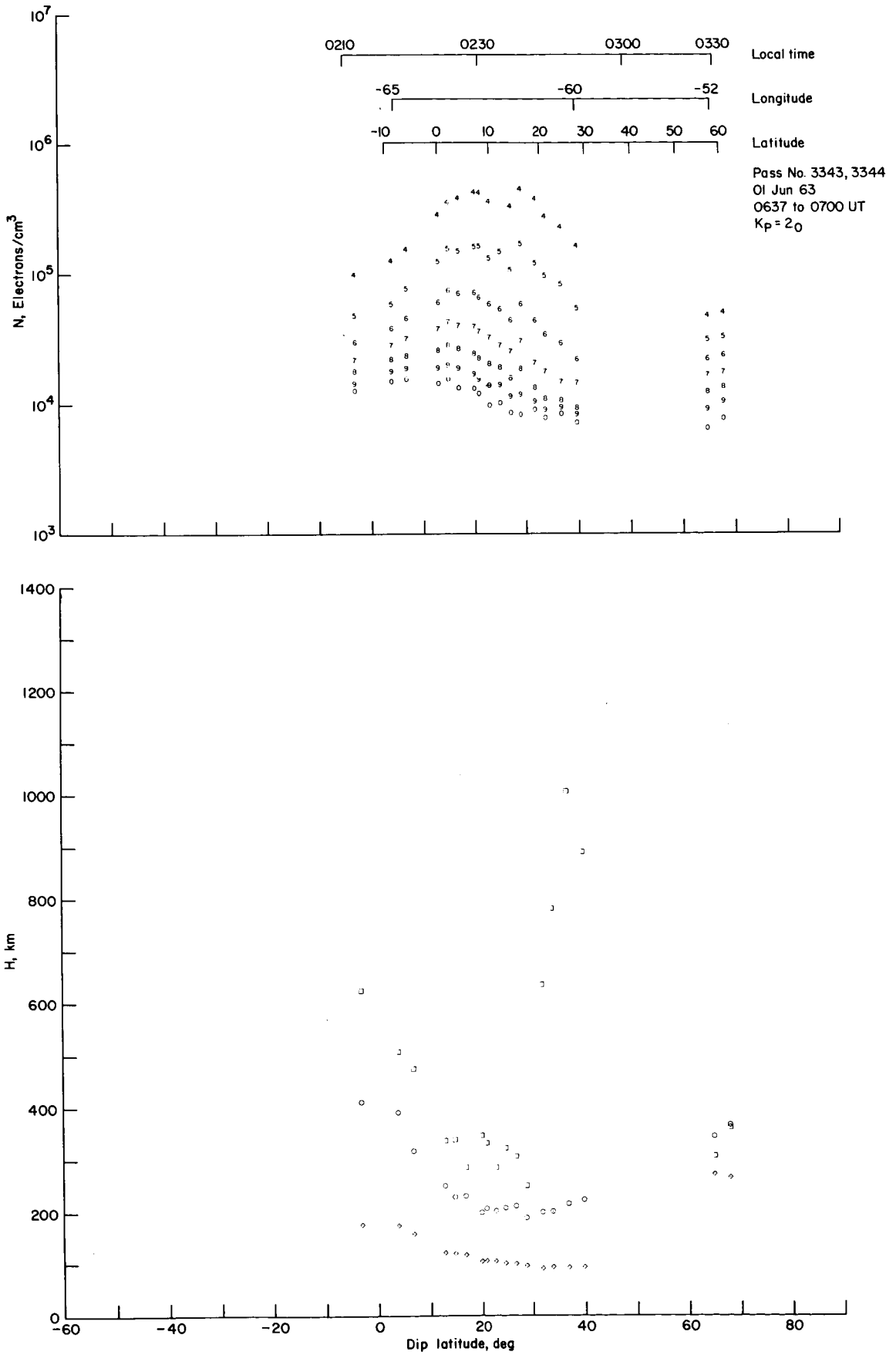

0210
0230
0300
0330
Local time
-65
-60
-52
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3343, 3344
01 Jun 63
0637 to 0700 UT
$K_P = 2_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 100

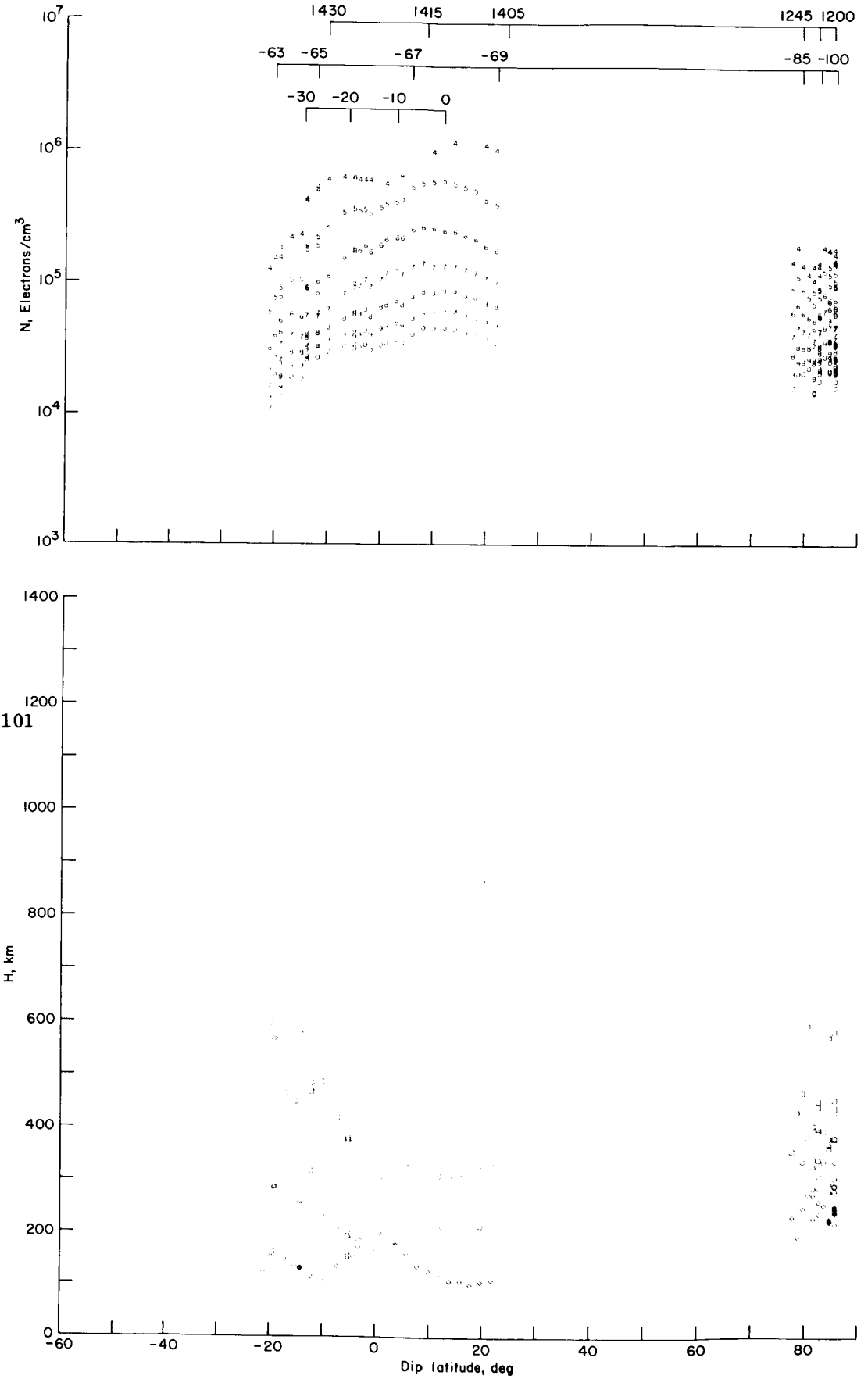

1430
1415
1405
1245 1200
Local time
-63 -65
-67
-69
-85 -100
Longitude
-30 -20 -10 0
Latitude
Pass No. 3364
02 Jun 63
1817 to 1856UT
$K_p = 2_+$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 101

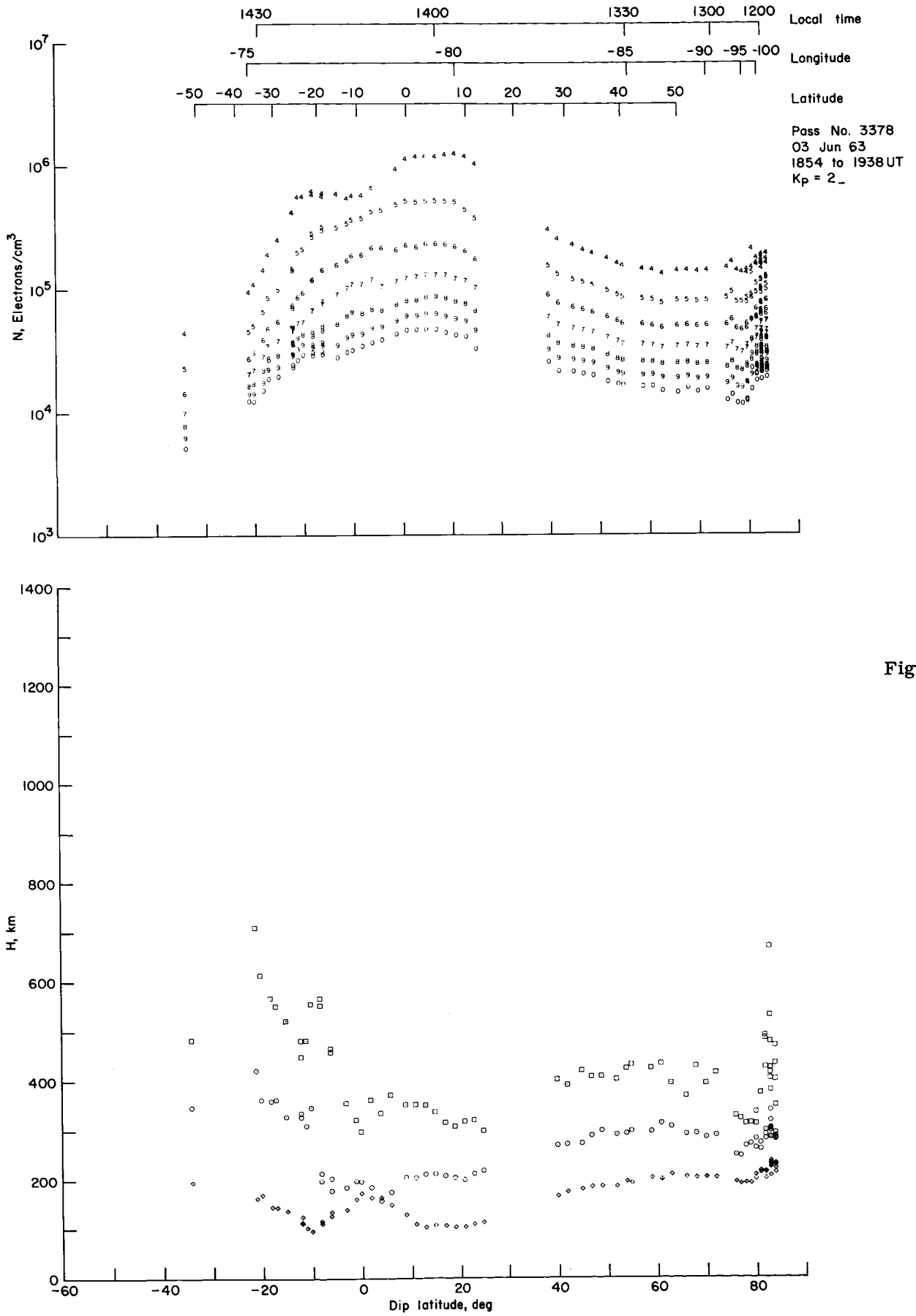
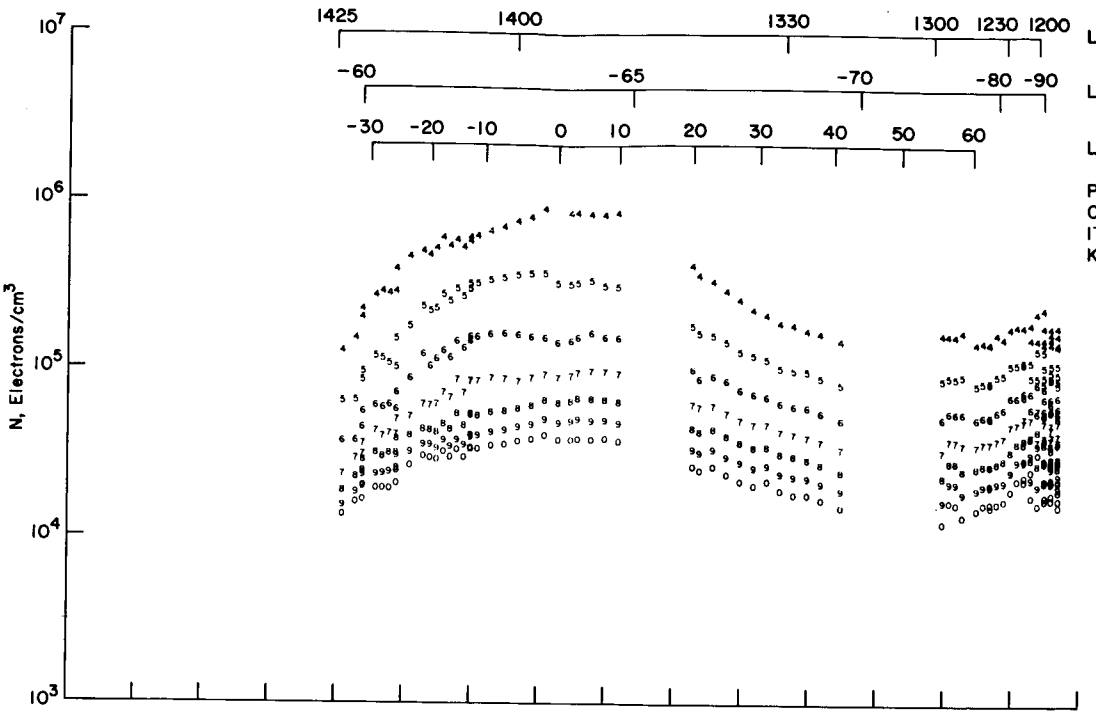

1430
1400
1330
1300
1200
Local time
-75
-80
-85
-90
-95
-100
Longitude
-50
-40
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3378
03 Jun 63
1854 to 1938 UT
Kp = 2_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 102


1425
1400
1330
1300
1230
1200
Local time
-60
-65
-70
-80
-90
Longitude
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3391
04 Jun 63
1748 to 1823 UT
Kp = 1_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

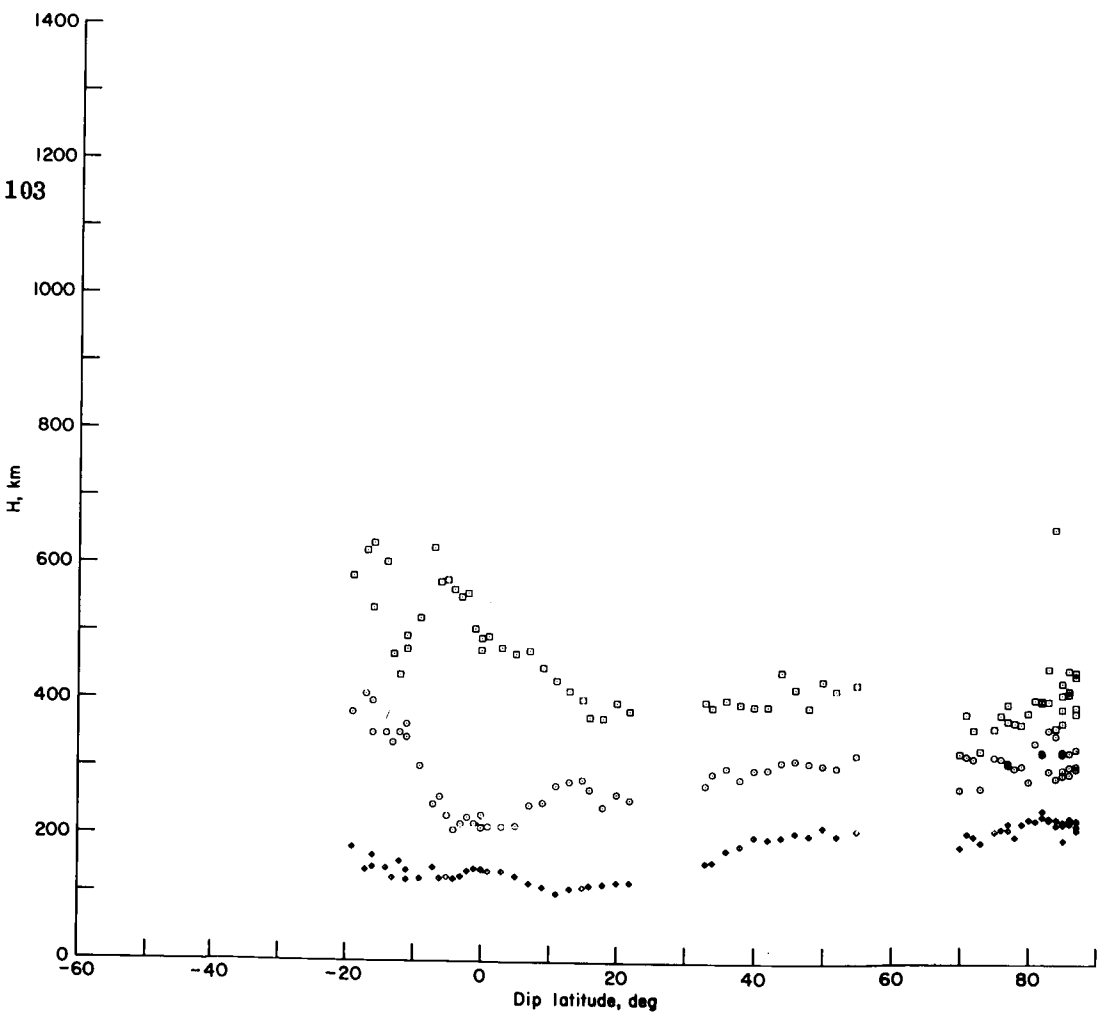
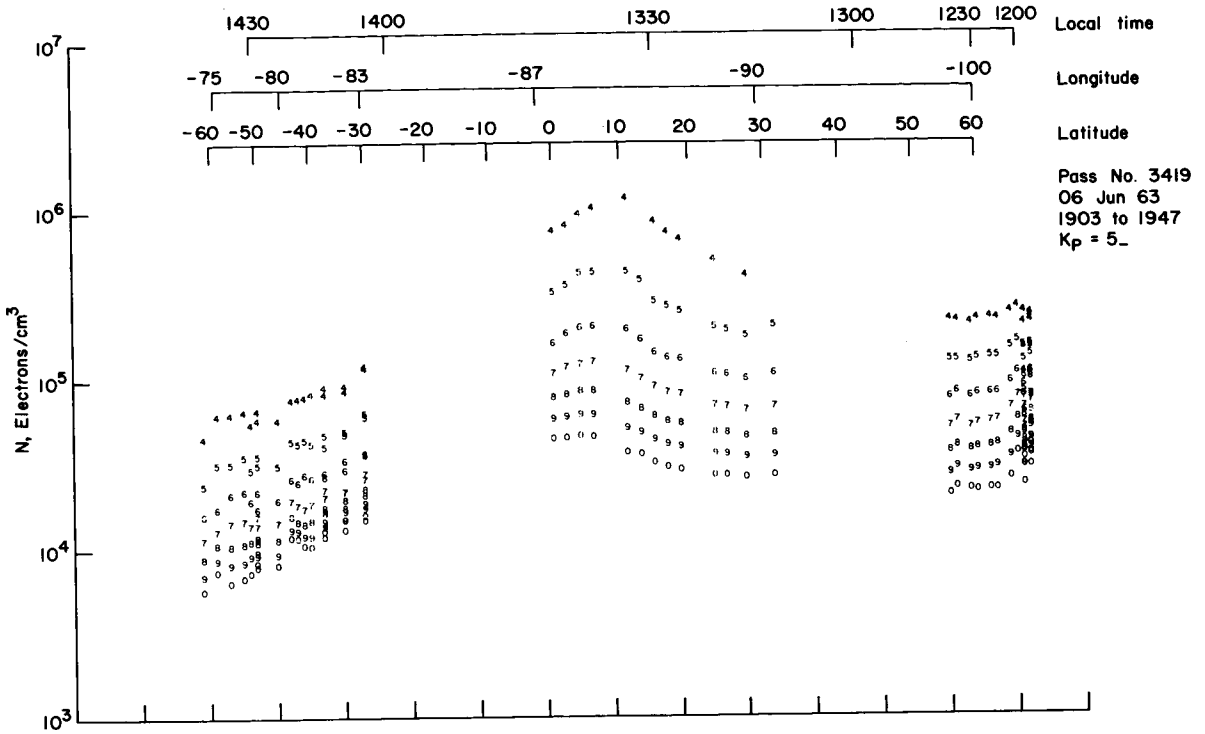

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 103


1430
1400
1330
1300
1230
1200
Local time
-75
-80
-83
-87
-90
-100
Longitude
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3419
06 Jun 63
1903 to 1947
Kp = 5-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

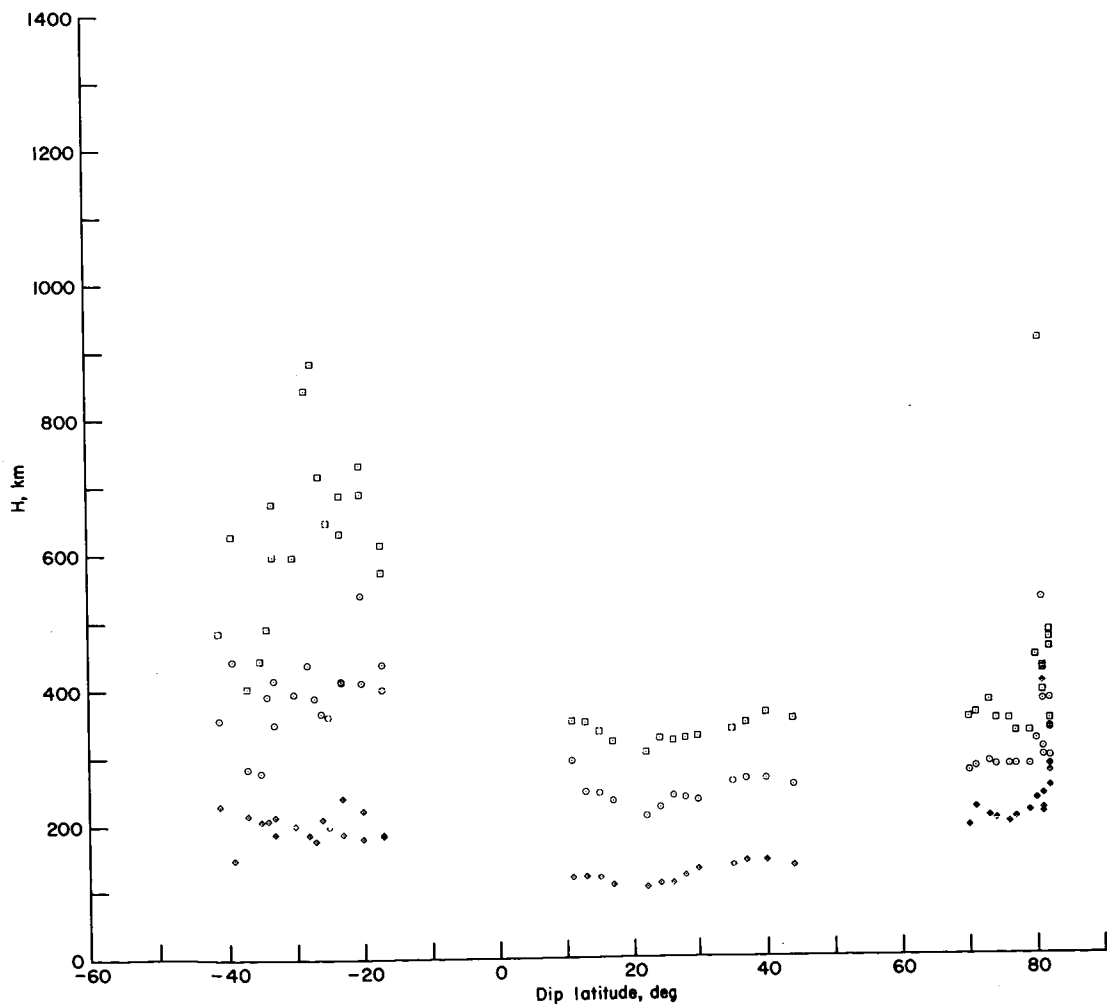
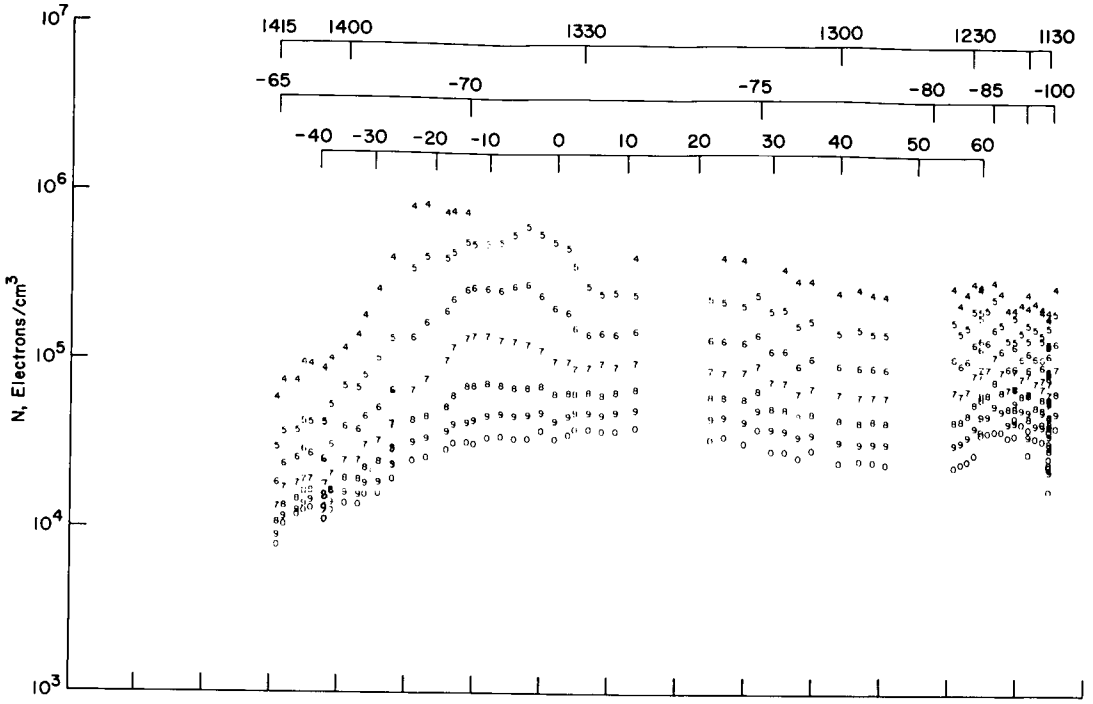

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 104


1415 1400 1330 1300 1230 1130
Local time
-65 -70 -75 -80 -85 -100
Longitude
-40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3432
07 Jun 63
1757 to 1832 UT
Kp = 4_ 3+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3

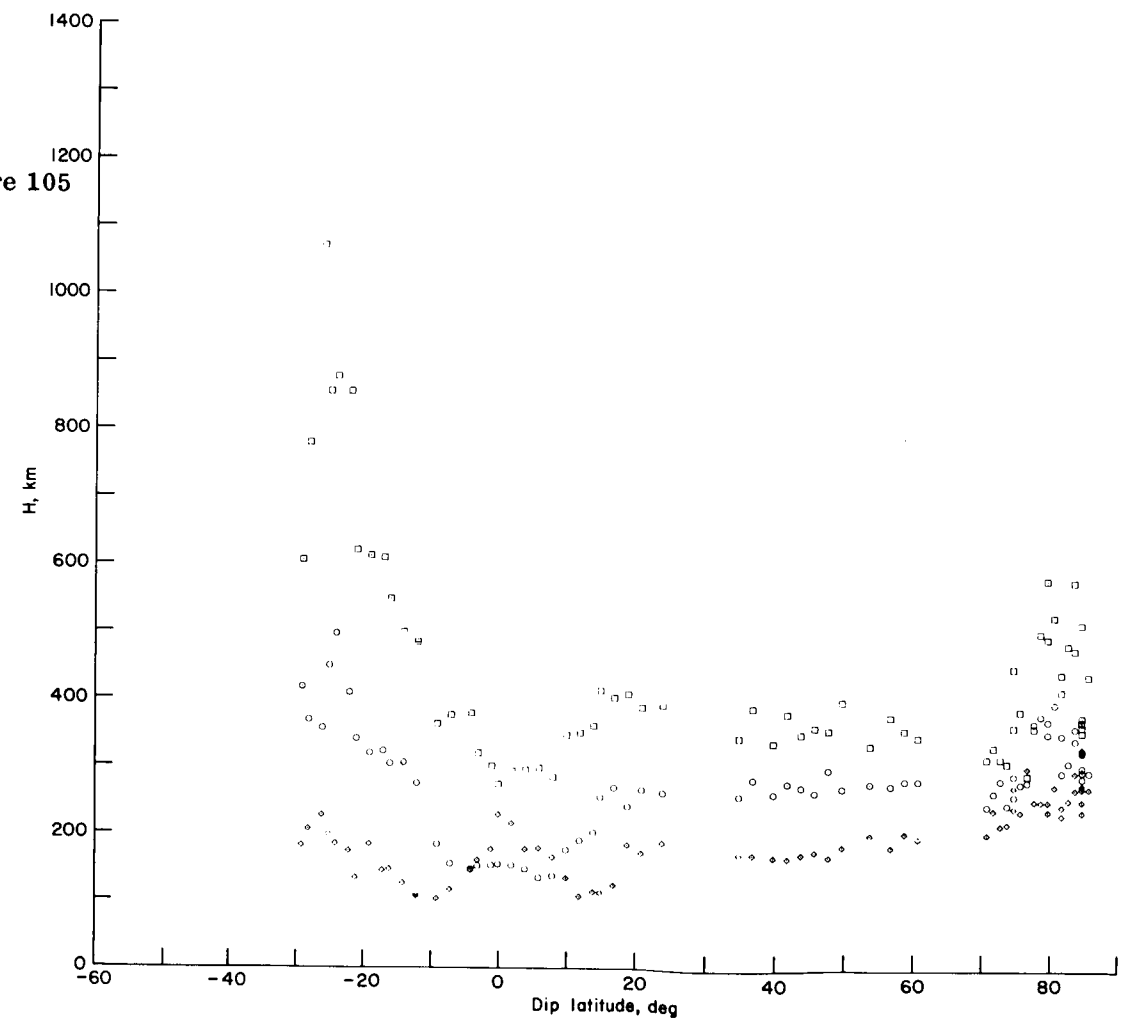

H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 105

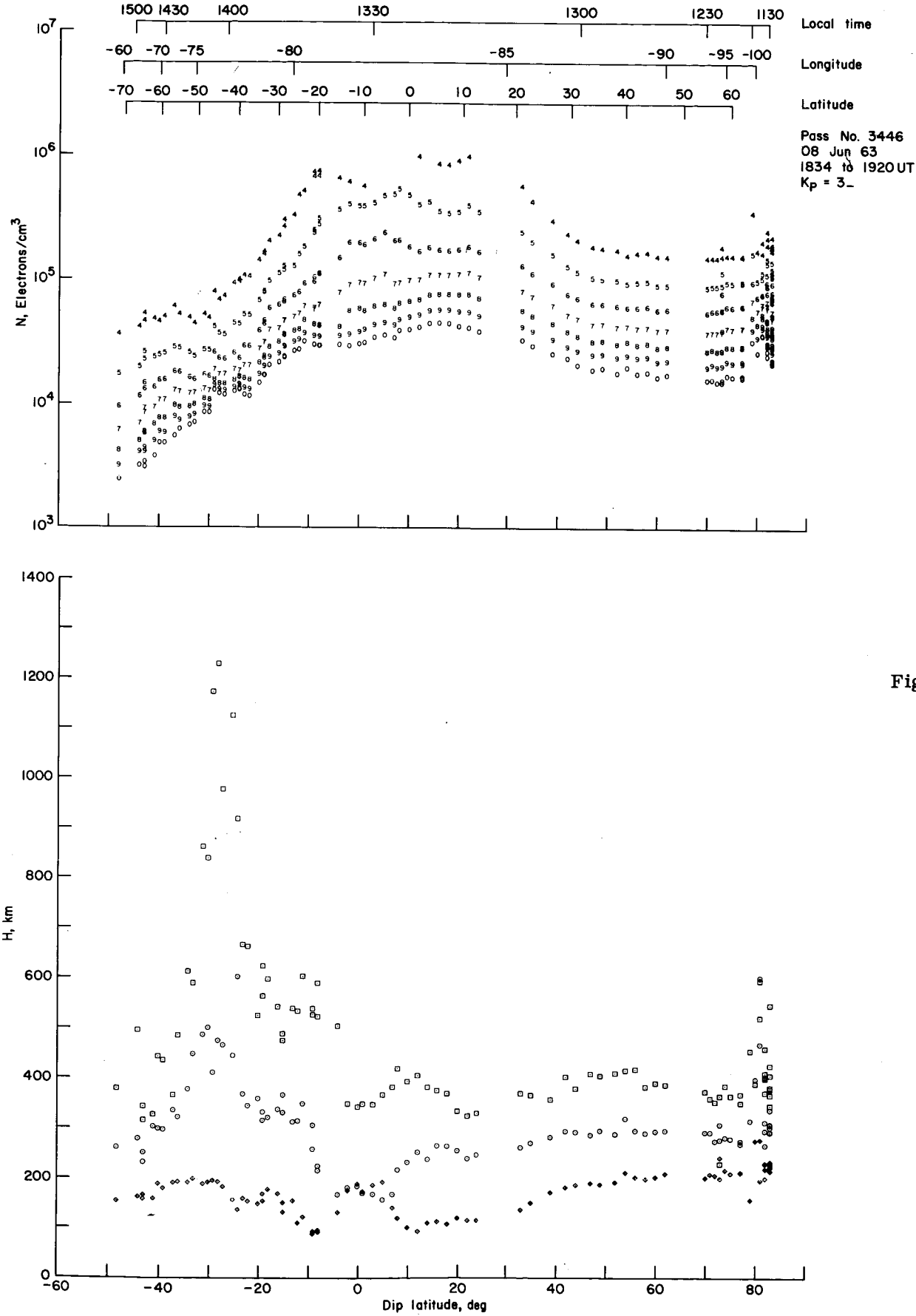

1500 1430 1400 1330 1300 1230 1130
Local time
-60 -70 -75 -80 -85 -90 -95 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3446
08 Jun 63
1834 to 1920 UT
Kp = 3-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 106

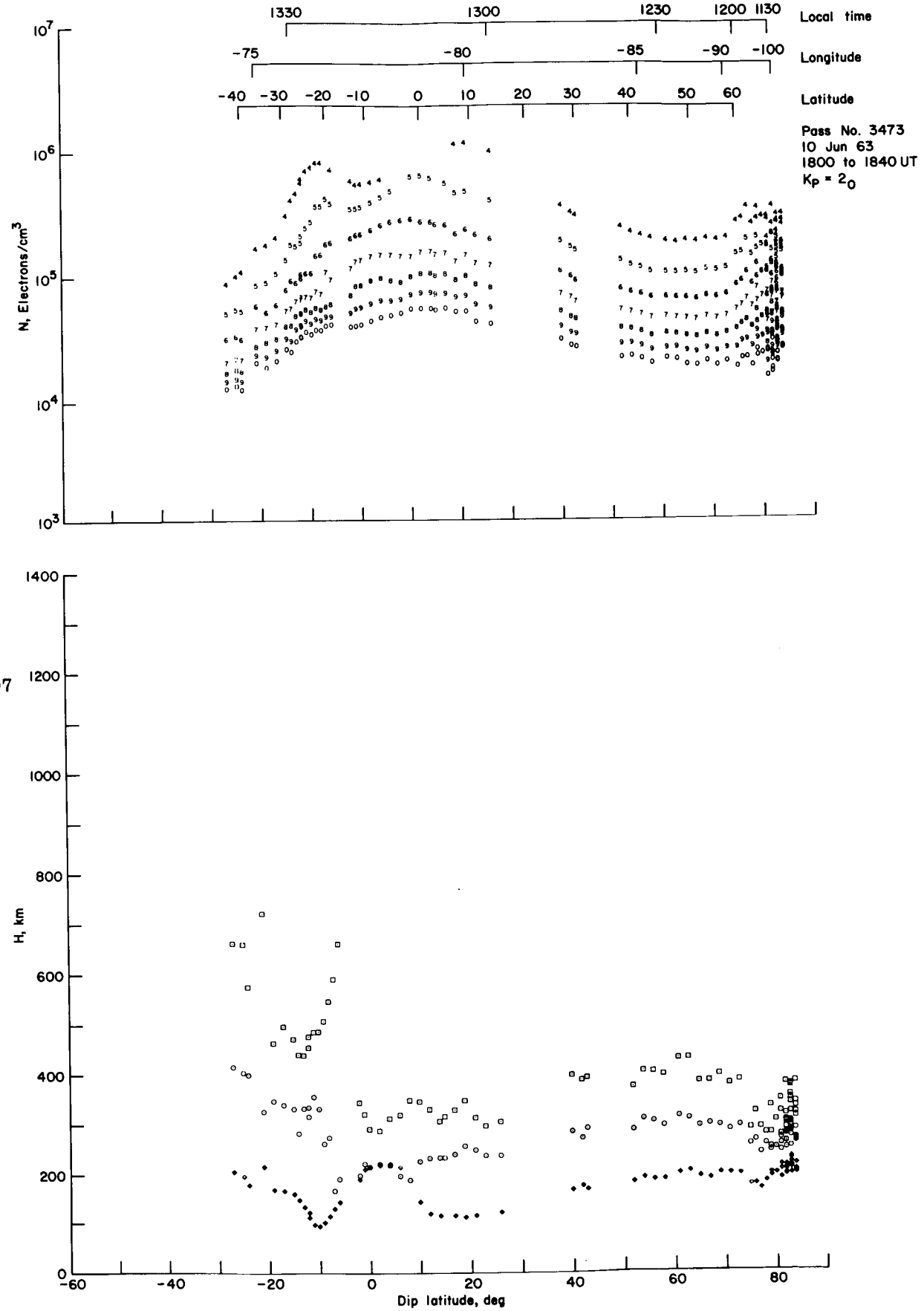

1330
1300
1230
1200 1130
Local time
-75
-80
-85
-90
-100
Longitude
-40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3473
10 Jun 63
1800 to 1840 UT
Kp = 2o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 107

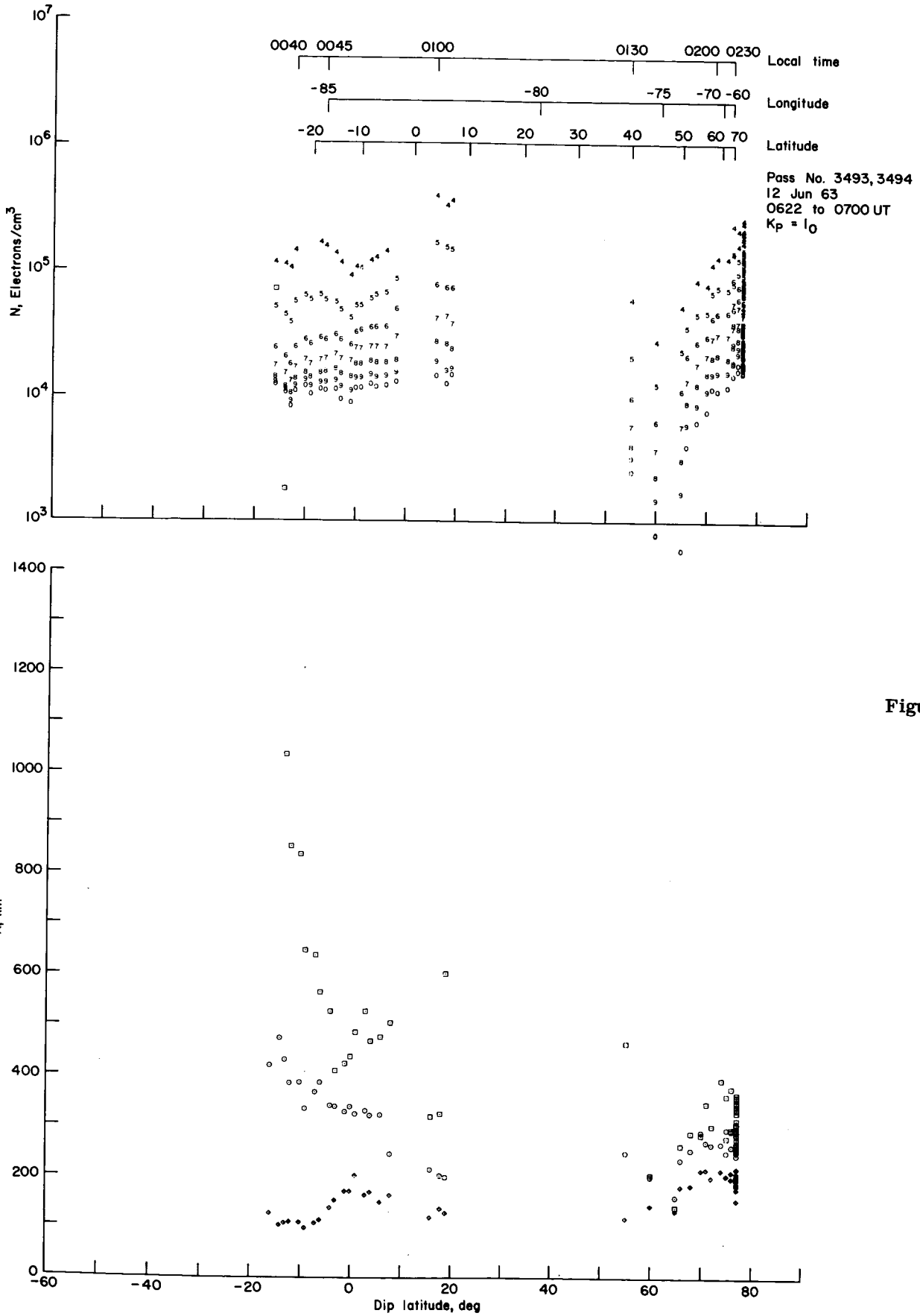

0040 0045 0100 0130 0200 0230
Local time
-85 -80 -75 -70 -60
Longitude
-20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 3493, 3494
12 Jun 63
0622 to 0700 UT
$K_P = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 108

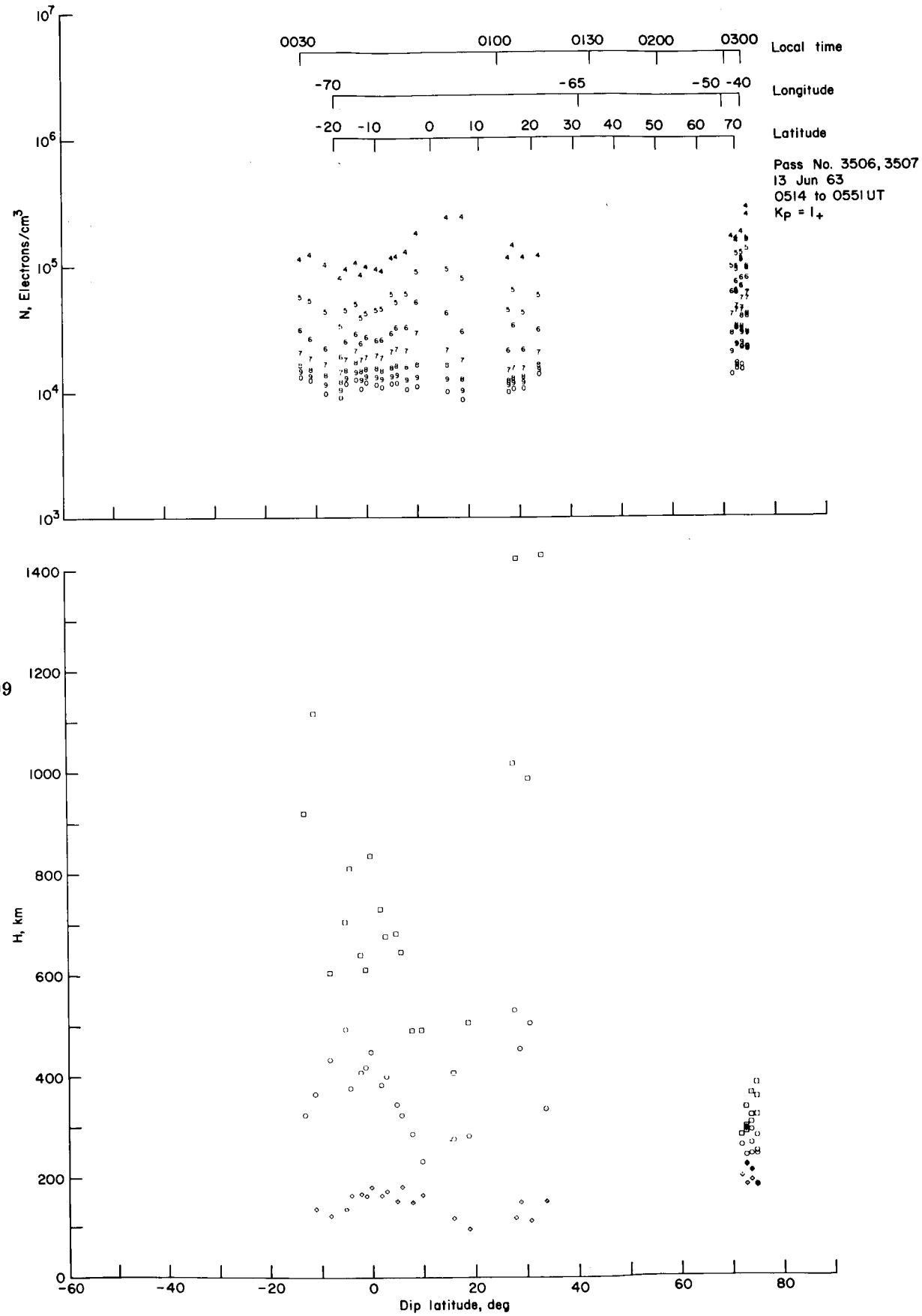

0030
0100
0130
0200
0300
Local time
-70
-65
-50 -40
Longitude
-20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 3506, 3507
13 Jun 63
0514 to 0551 UT
Kp = 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 109

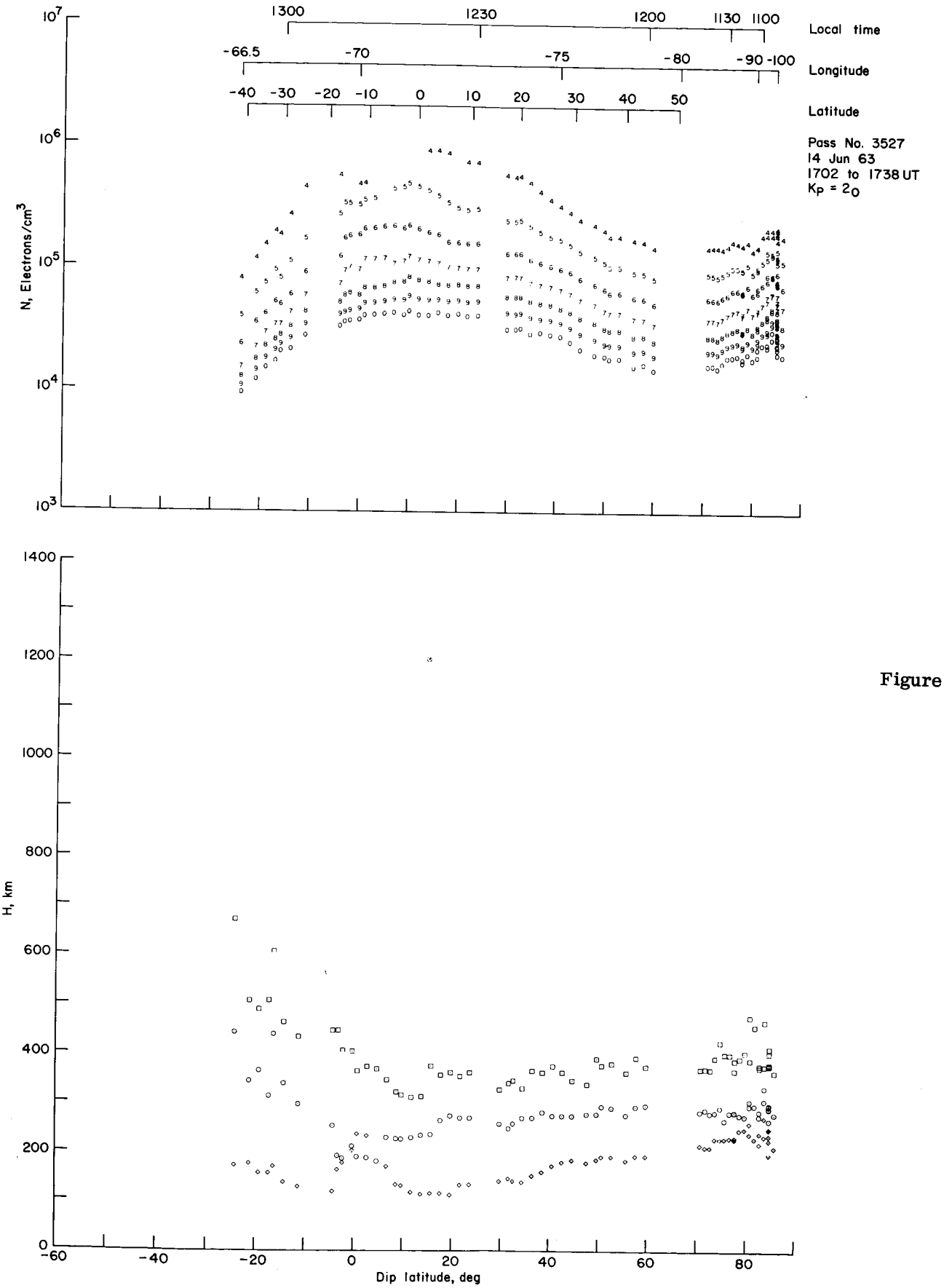

1300
1230
1200
1130 1100
Local time
-66.5
-70
-75
-80
-90 -100
Longitude
-40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 3527
14 Jun 63
1702 to 1738 UT
Kp = 2o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 110

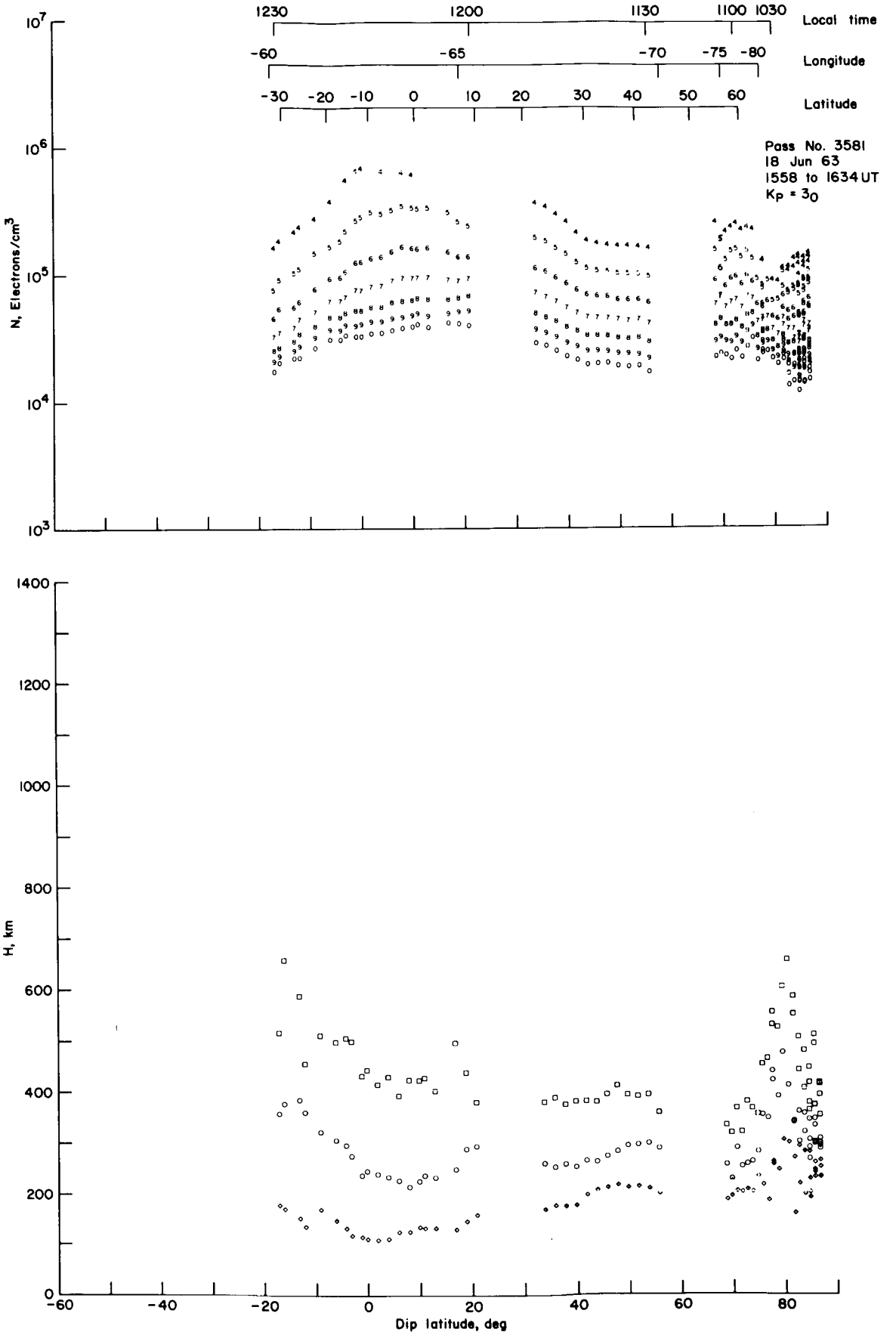

1230
1200
1130
1100 1030
Local time
-60
-65
-70
-75 -80
Longitude
-30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3581
18 Jun 63
1558 to 1634 UT
Kp = 3o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 111

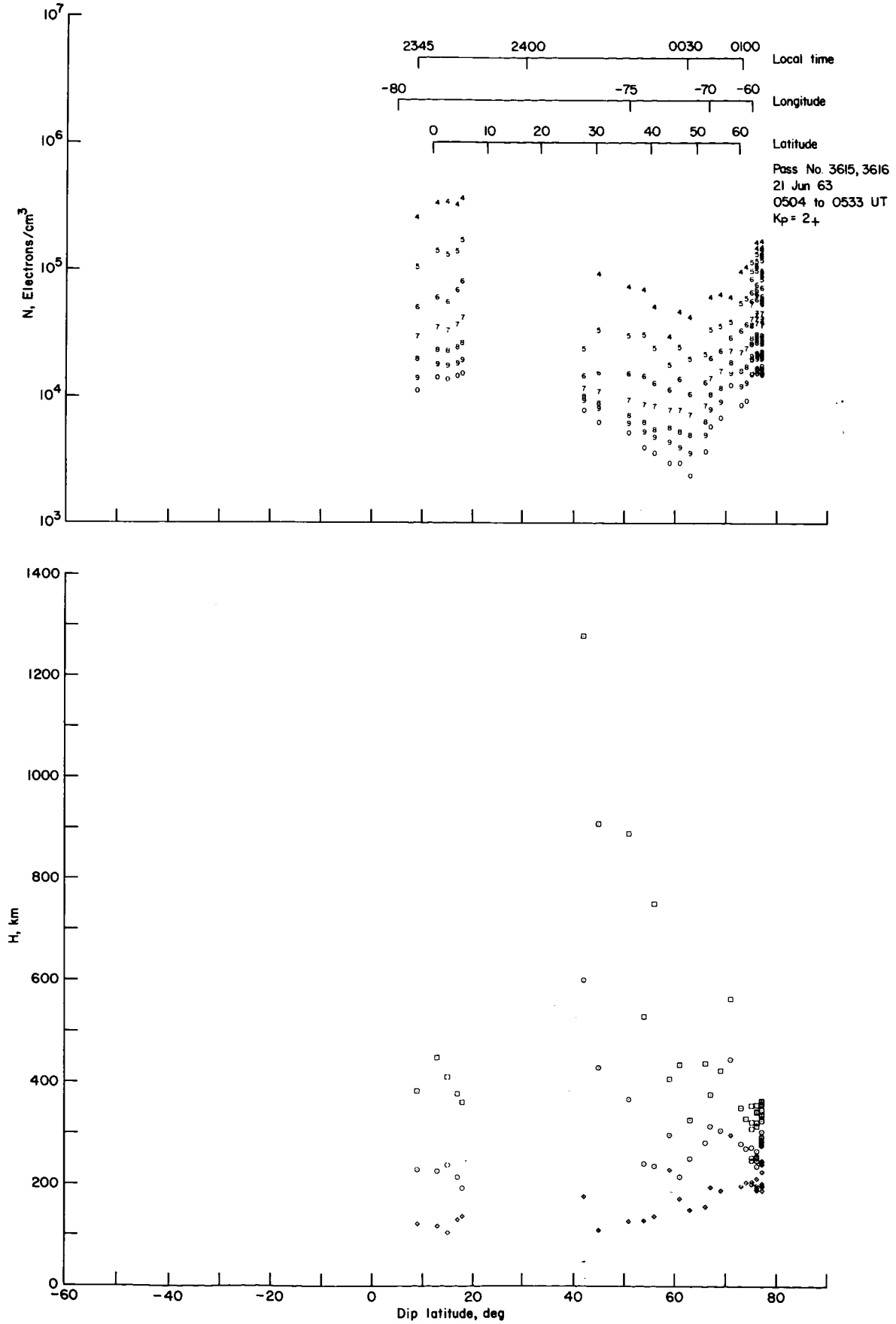

2345
2400
0030
0100
Local time
-80
-75
-70
-60
Longitude
0
10
20
30
40
50
60
Latitude
Pass No. 3615, 3616
21 Jun 63
0504 to 0533 UT
Kp = 2+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 112

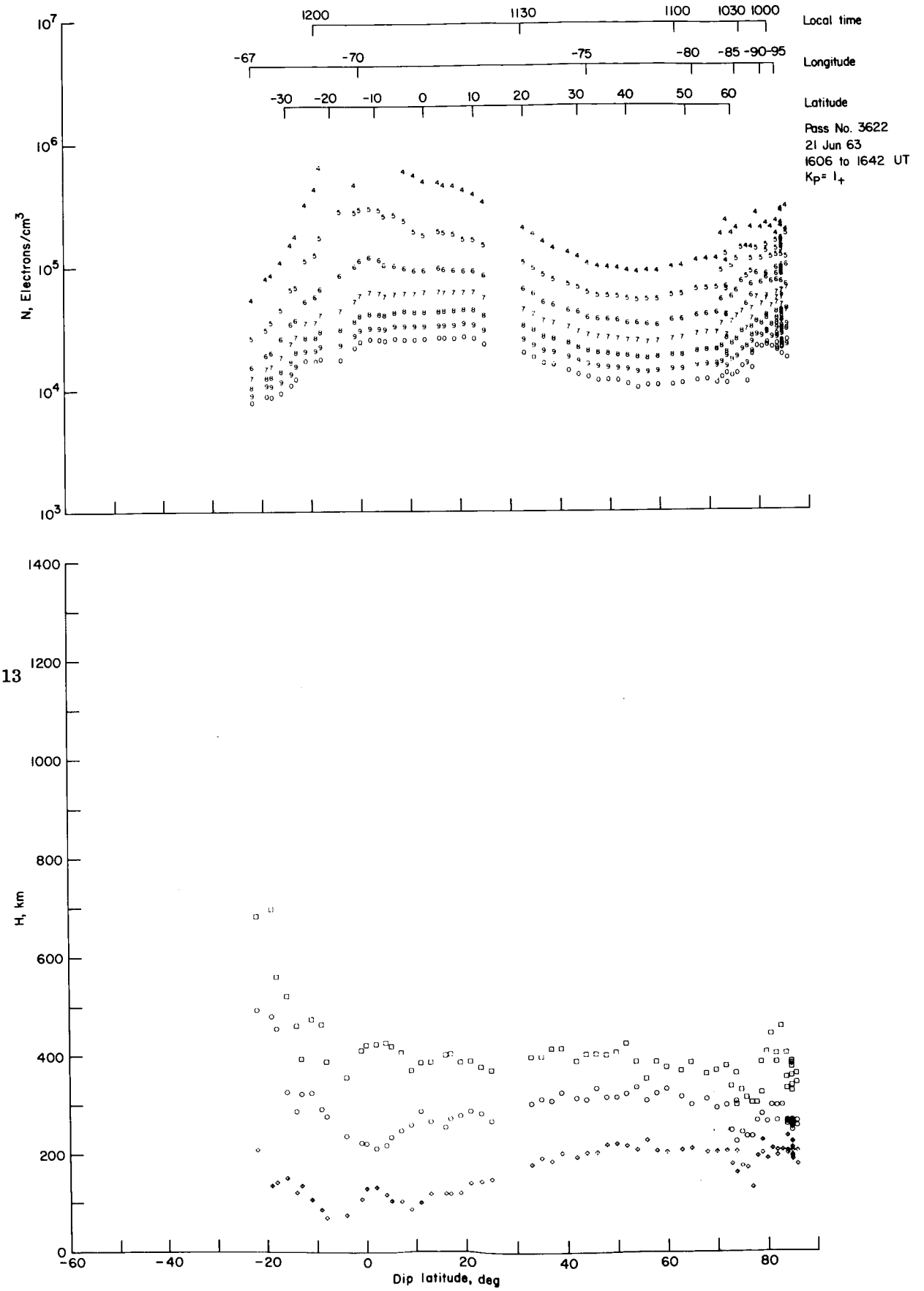

1200
1130
1100
1030 1000
Local time
-67
-70
-75
-80
-85 -90-95
Longitude
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3622
21 Jun 63
1606 to 1642 UT
Kp= 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 113

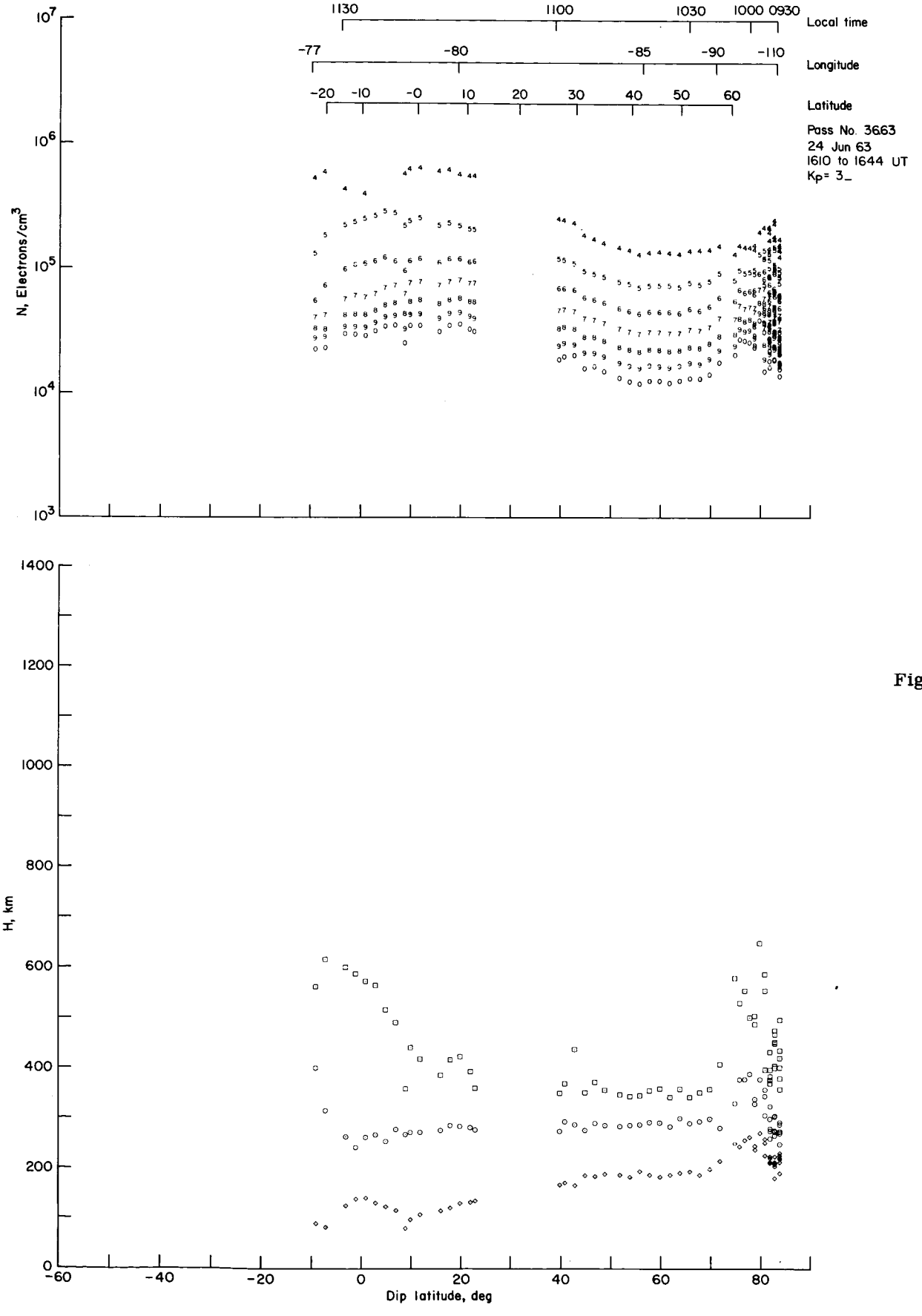

1130
1100
1030
1000 0930
Local time
-77
-80
-85
-90
-110
Longitude
-20 -10 -0 10 20 30 40 50 60
Latitude
Pass No. 3663
24 Jun 63
1610 to 1644 UT
Kp= 3_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 114

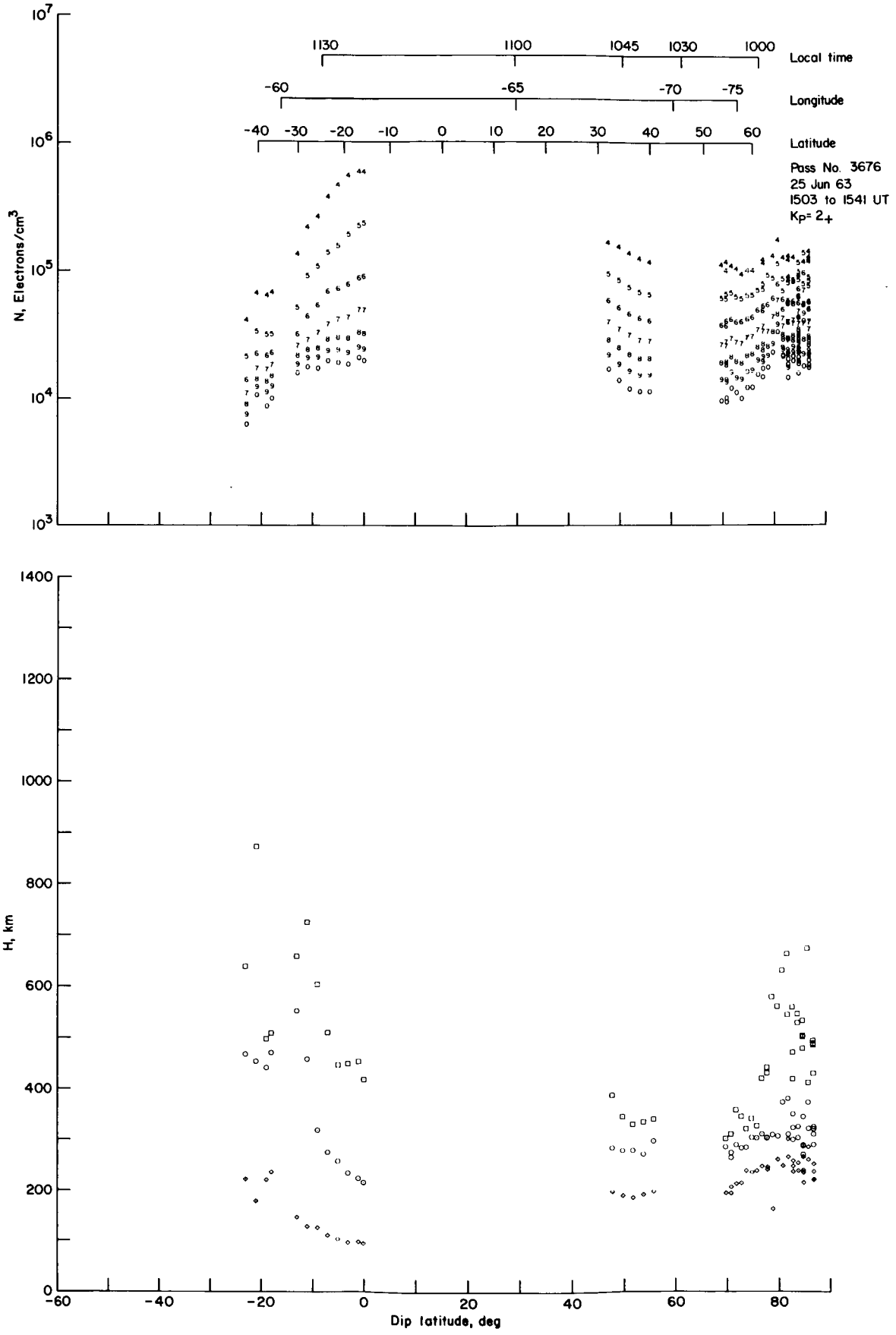

1130
1100
1045
1030
1000
Local time
-60
-65
-70
-75
Longitude
-40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3676
25 Jun 63
1503 to 1541 UT
Kp= 2+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 115

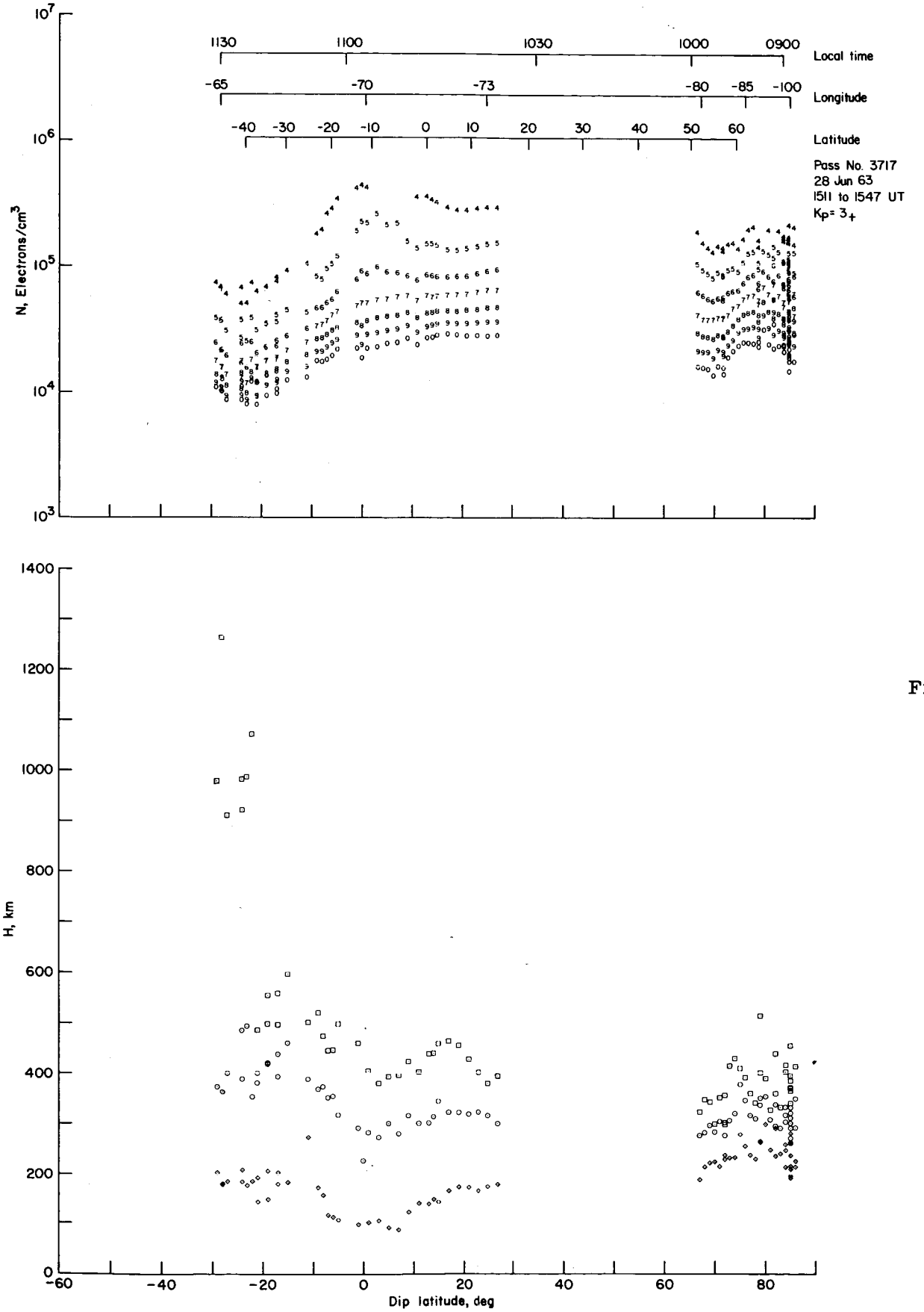

1130
1100
1030
1000
0900
Local time
-65
-70
-73
-80
-85
-100
Longitude
-40
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3717
28 Jun 63
1511 to 1547 UT
Kp= 3+
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 116

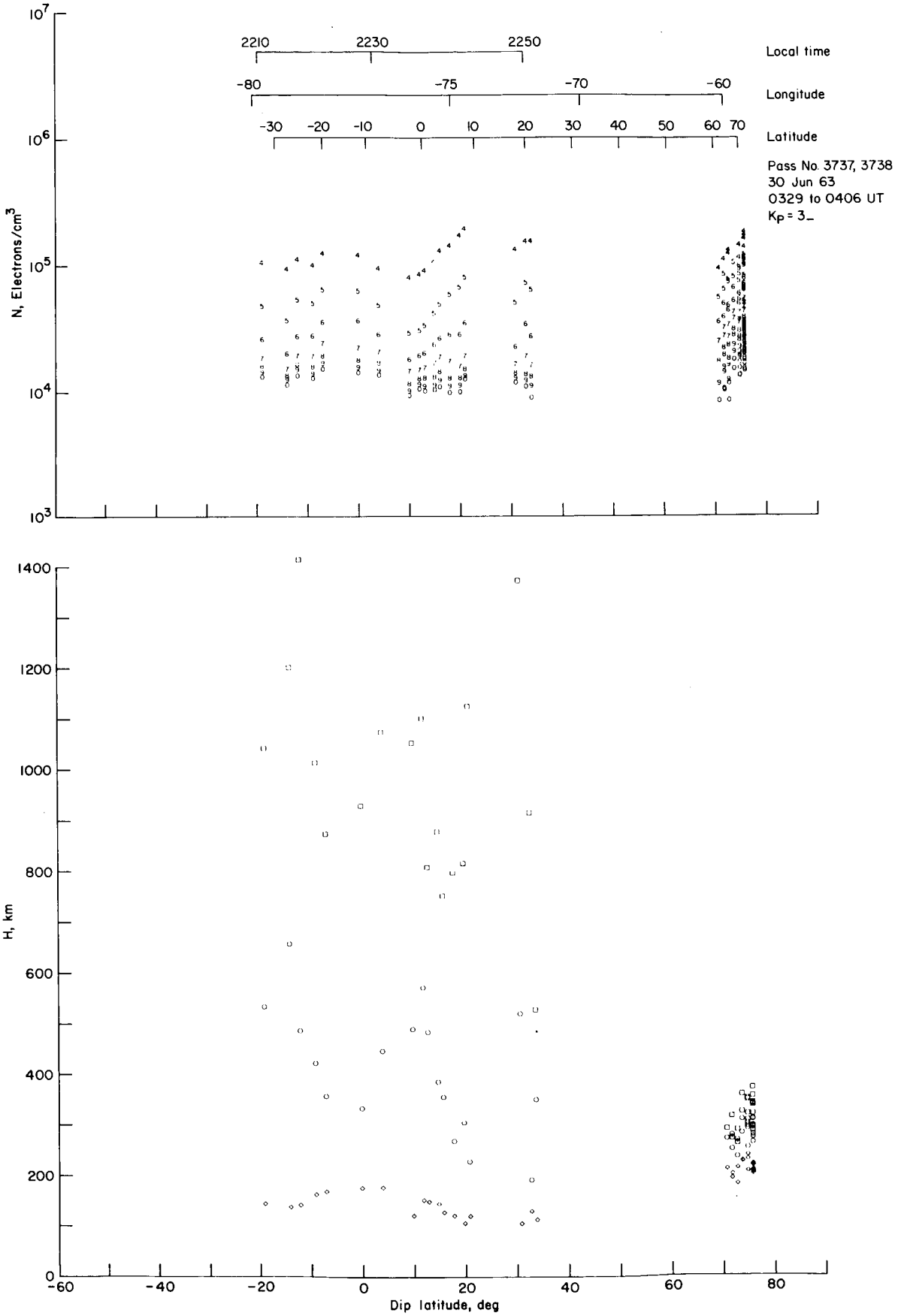

2210
2230
2250
Local time
-80
-75
-70
-60
Longitude
-30
-20
-10
0
10
20
30
40
50
60
70
Latitude
Pass No. 3737, 3738
30 Jun 63
0329 to 0406 UT
Kp = 3-
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 117

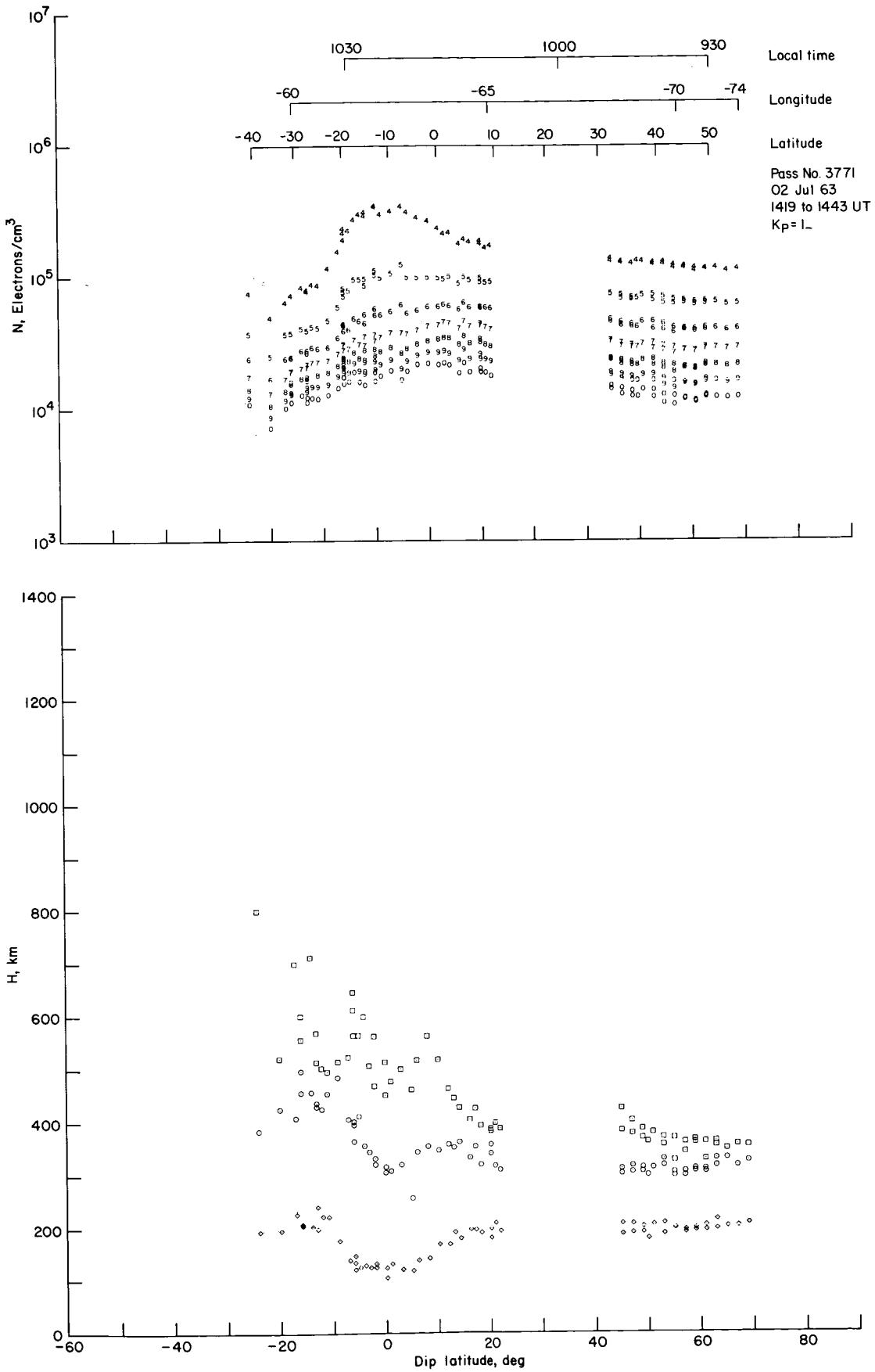

1030
1000
930
Local time
-60
-65
-70
-74
Longitude
-40
-30
-20
-10
0
10
20
30
40
50
Latitude
Pass No. 3771
02 Jul 63
1419 to 1443 UT
Kp= 1-
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 118

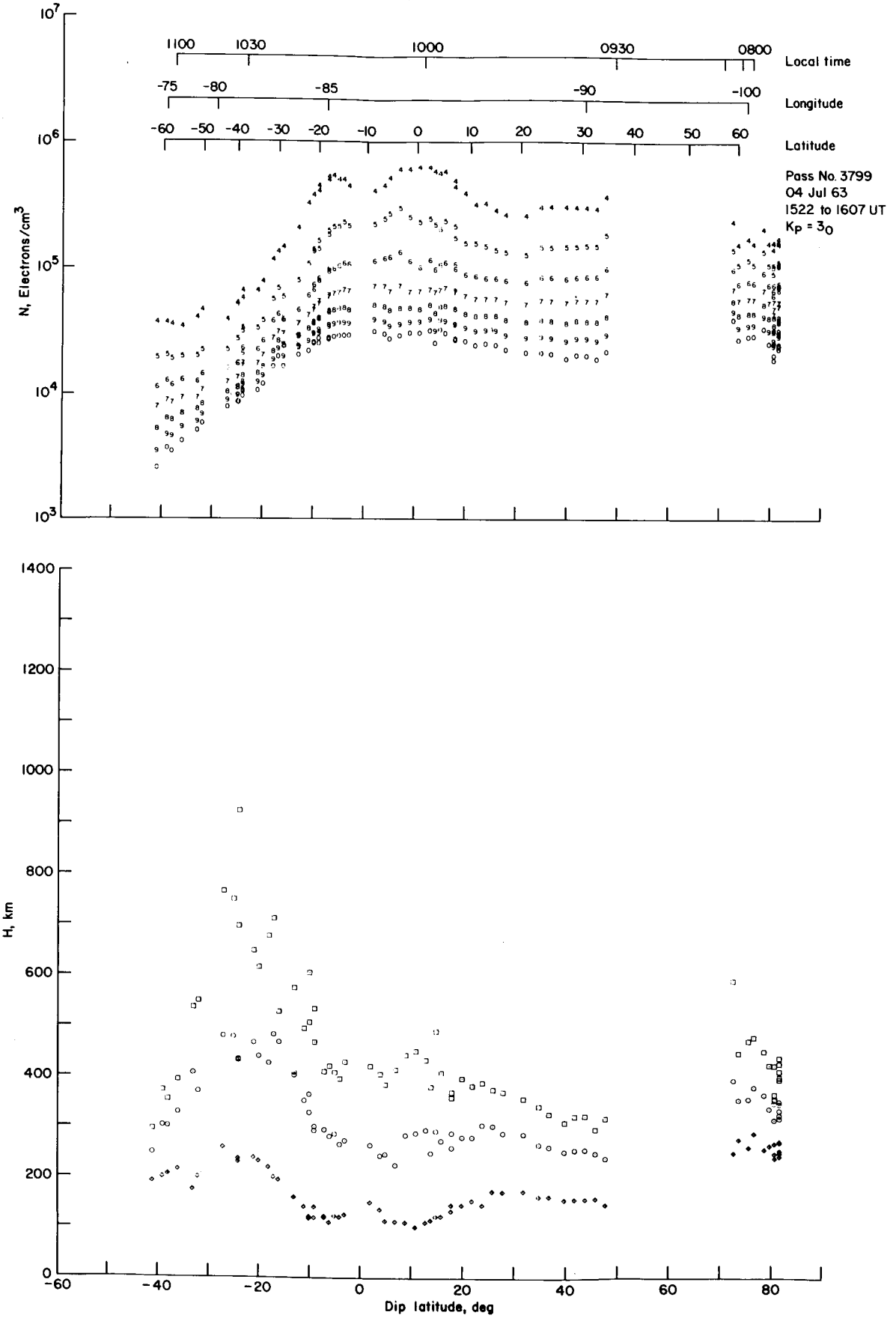
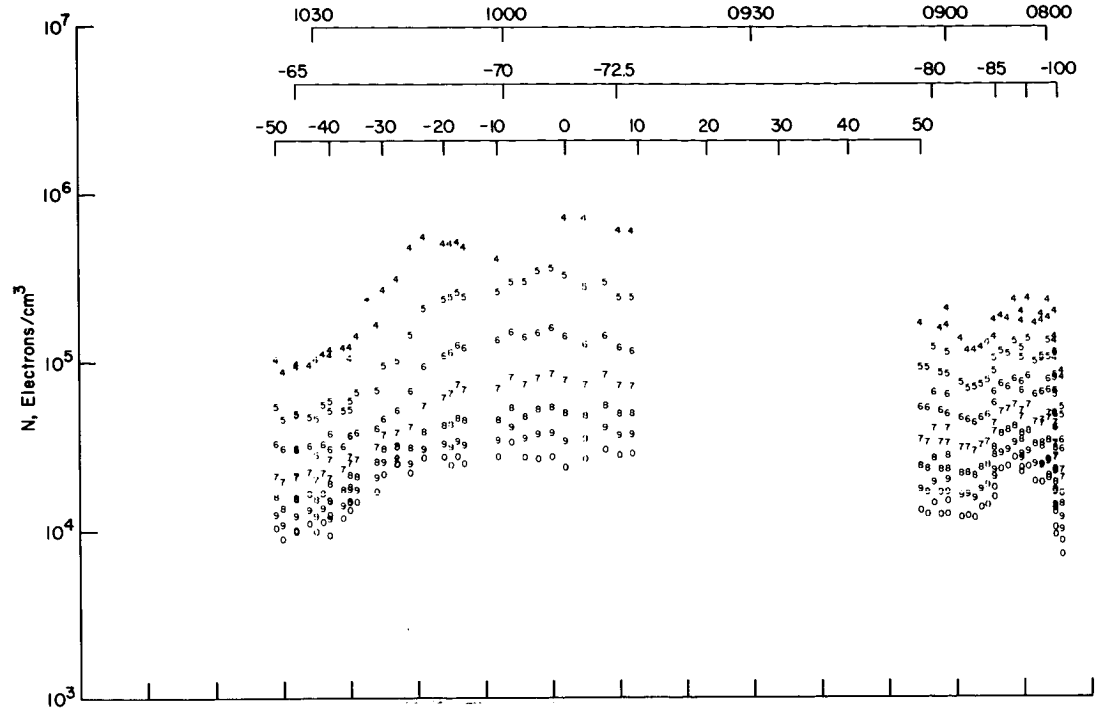

1100
1030
1000
0930
0800
Local time
-75
-80
-85
-90
-100
Longitude
-60
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3799
04 Jul 63
1522 to 1607 UT
Kp = 3o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 119


1030
1000
0930
0900
0800
Local time
-65
-70
-72.5
-80
-85
-100
Longitude
-50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 3812
05 Jul 63
1416 to 1454 UT
$K_P = 2_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3

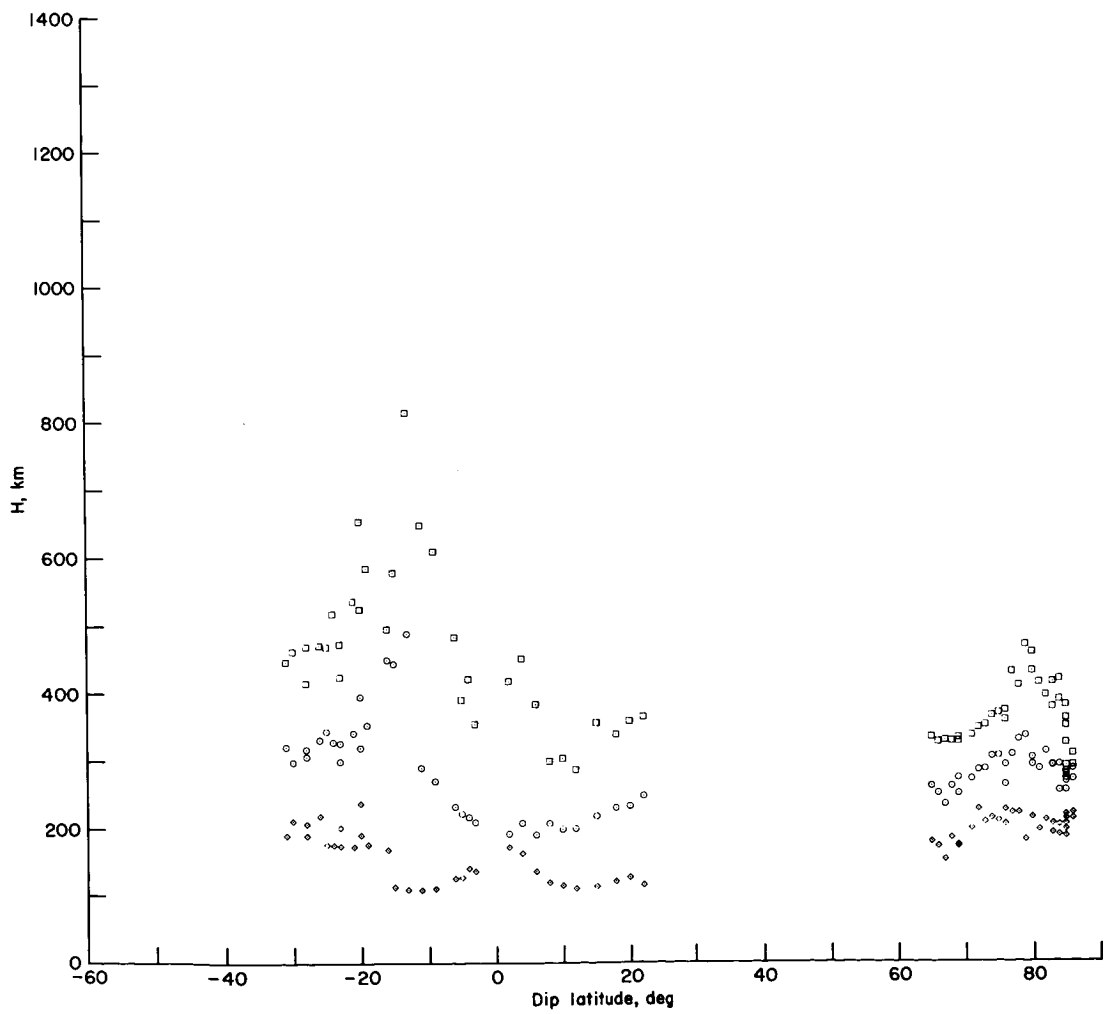

1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 120

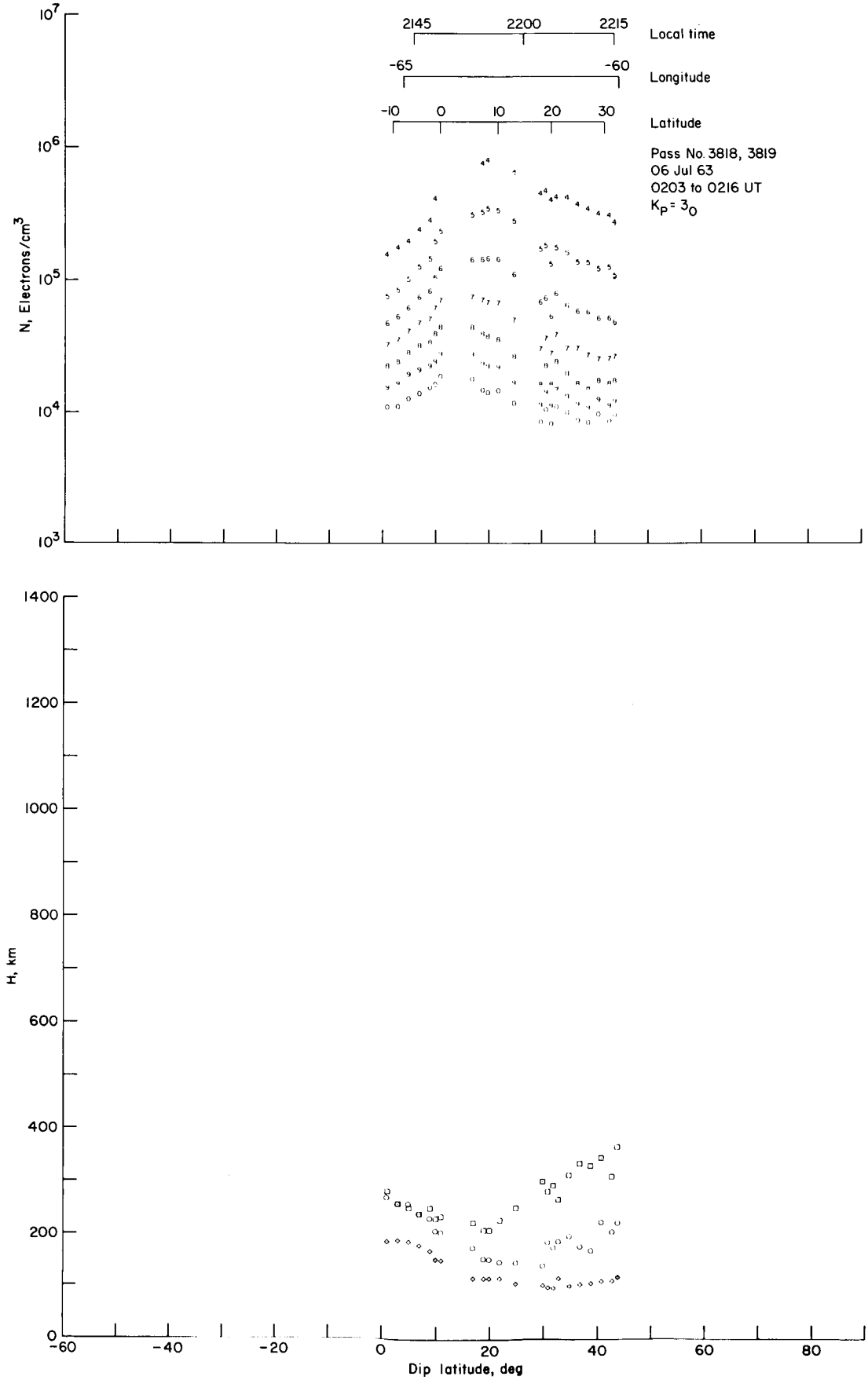

2145
2200
2215
Local time
-65
-60
Longitude
-10
0
10
20
30
Latitude
Pass No. 3818, 3819
06 Jul 63
0203 to 0216 UT
$K_P = 3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 121

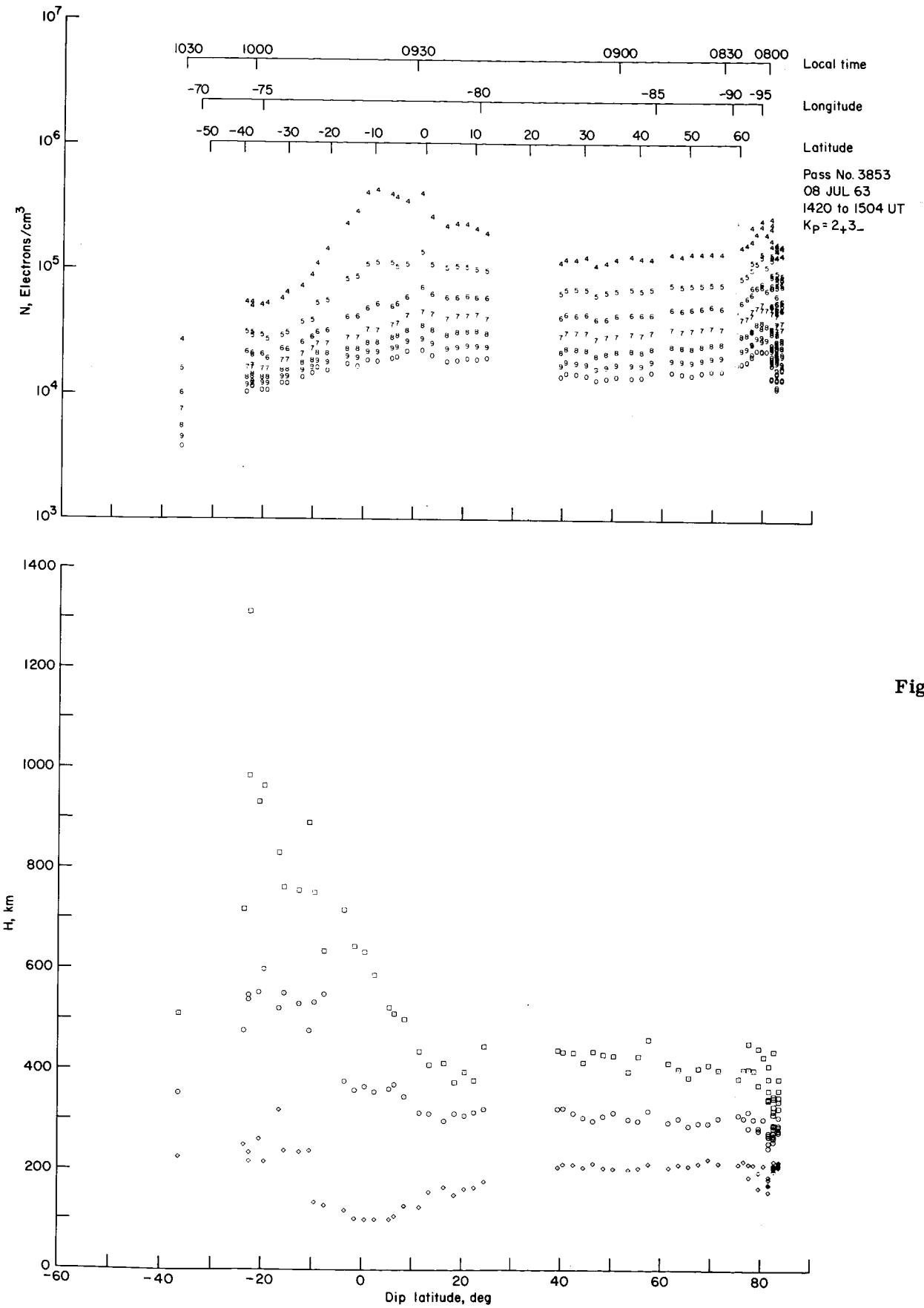

1030
1000
0930
0900
0830
0800
Local time
-70
-75
-80
-85
-90
-95
Longitude
-50
-40
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3853
08 JUL 63
1420 to 1504 UT
Kp = 2+3-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 122

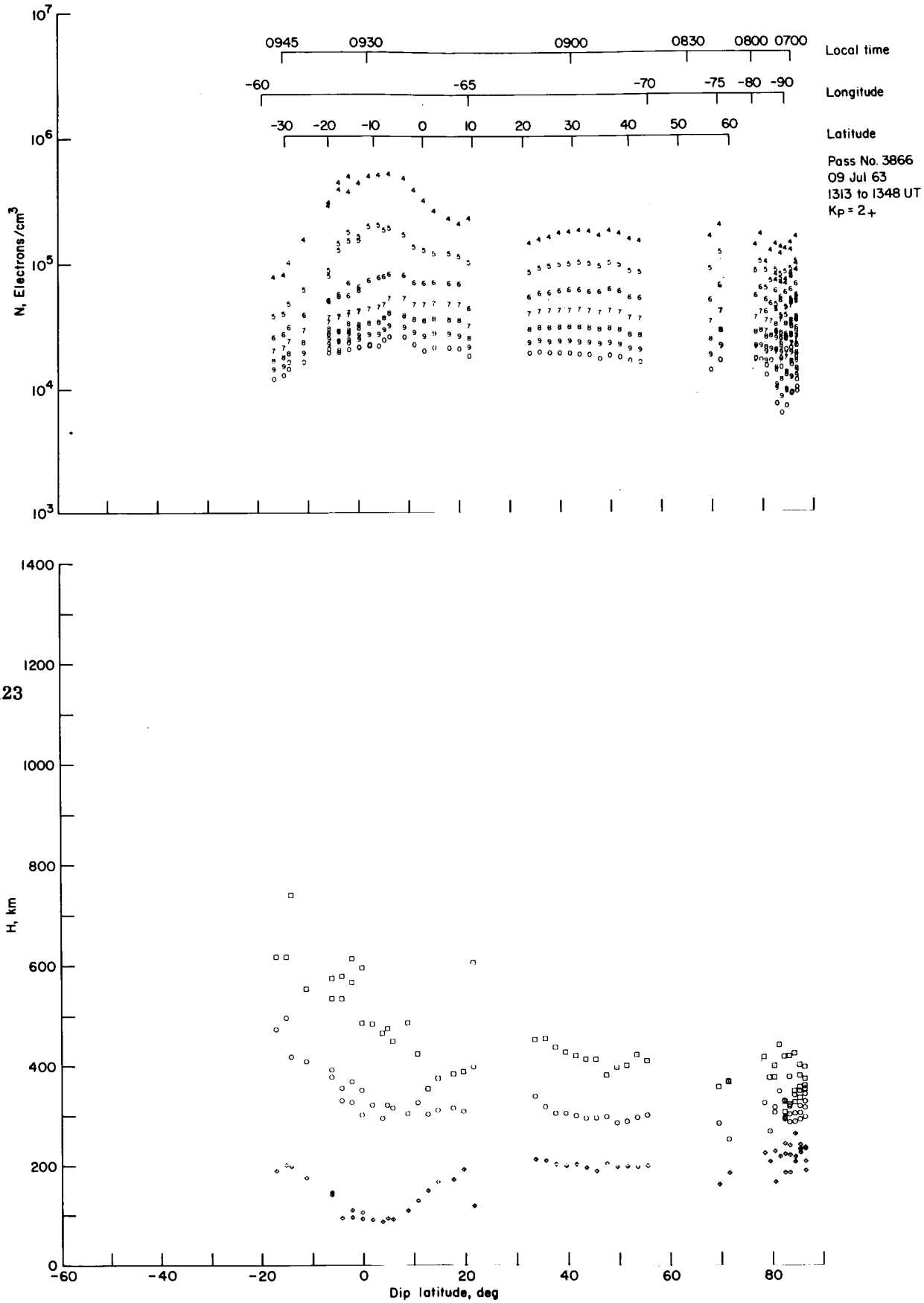

0945
0930
0900
0830
0800 0700
Local time
-60
-65
-70
-75
-80
-90
Longitude
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3866
09 Jul 63
1313 to 1348 UT
Kp = 2+
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 123

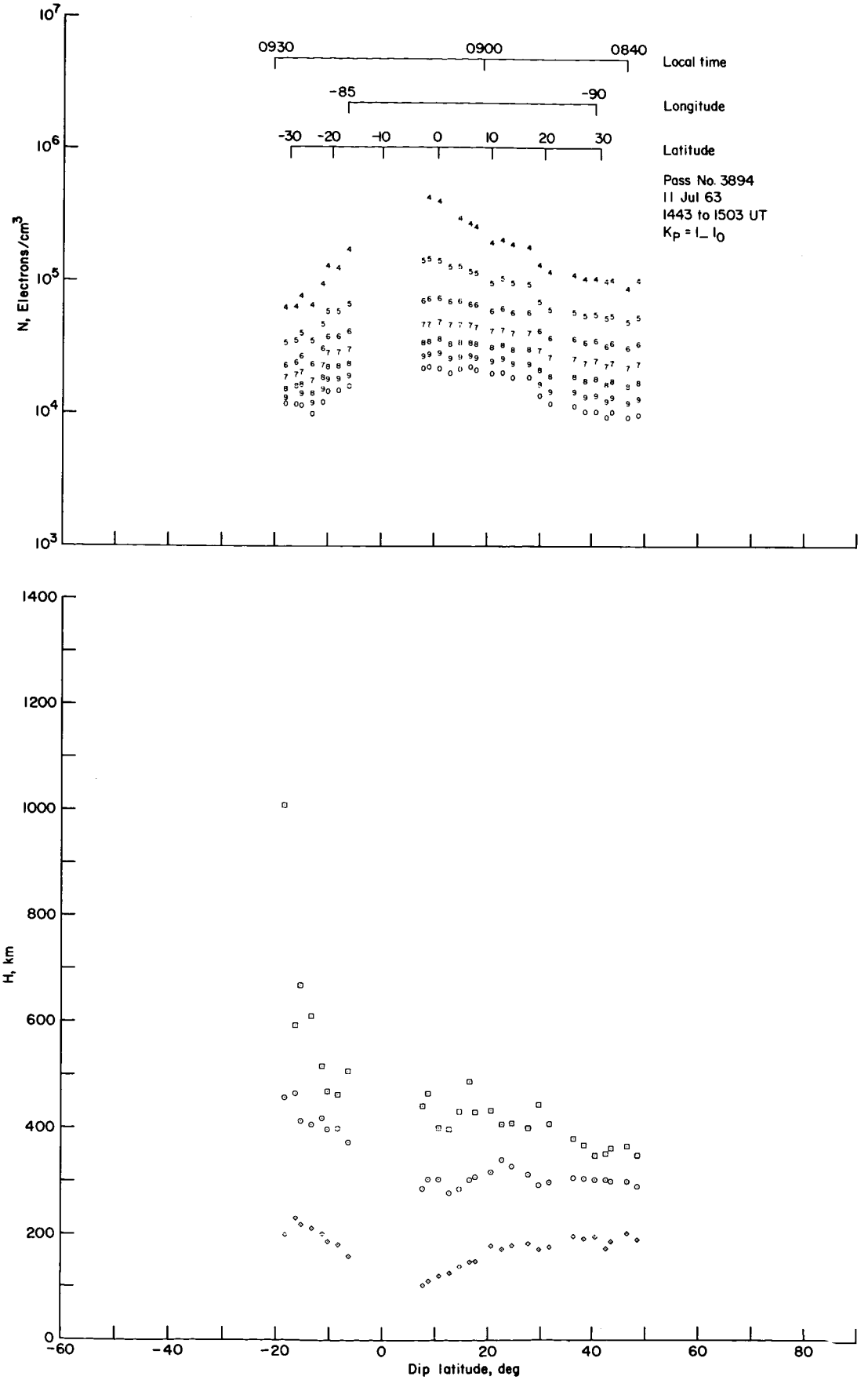

0930
0900
0840
Local time
-85
-90
Longitude
-30 -20 -10 0 10 20 30
Latitude
Pass No. 3894
11 Jul 63
1443 to 1503 UT
$K_P = 1_- 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 124

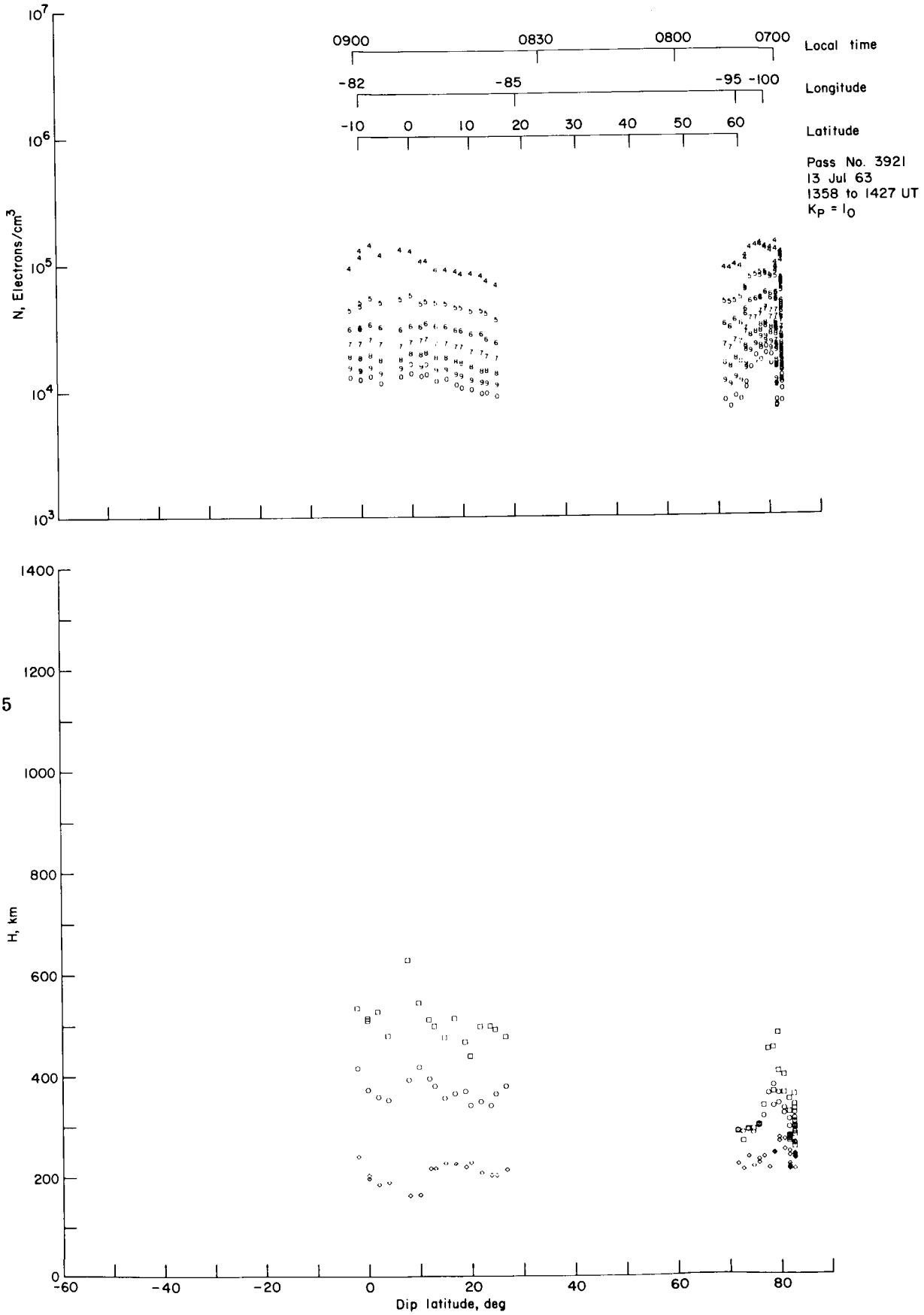

0900
0830
0800
0700
Local time
-82
-85
-95 -100
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 3921
13 Jul 63
1358 to 1427 UT
$K_P = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 125

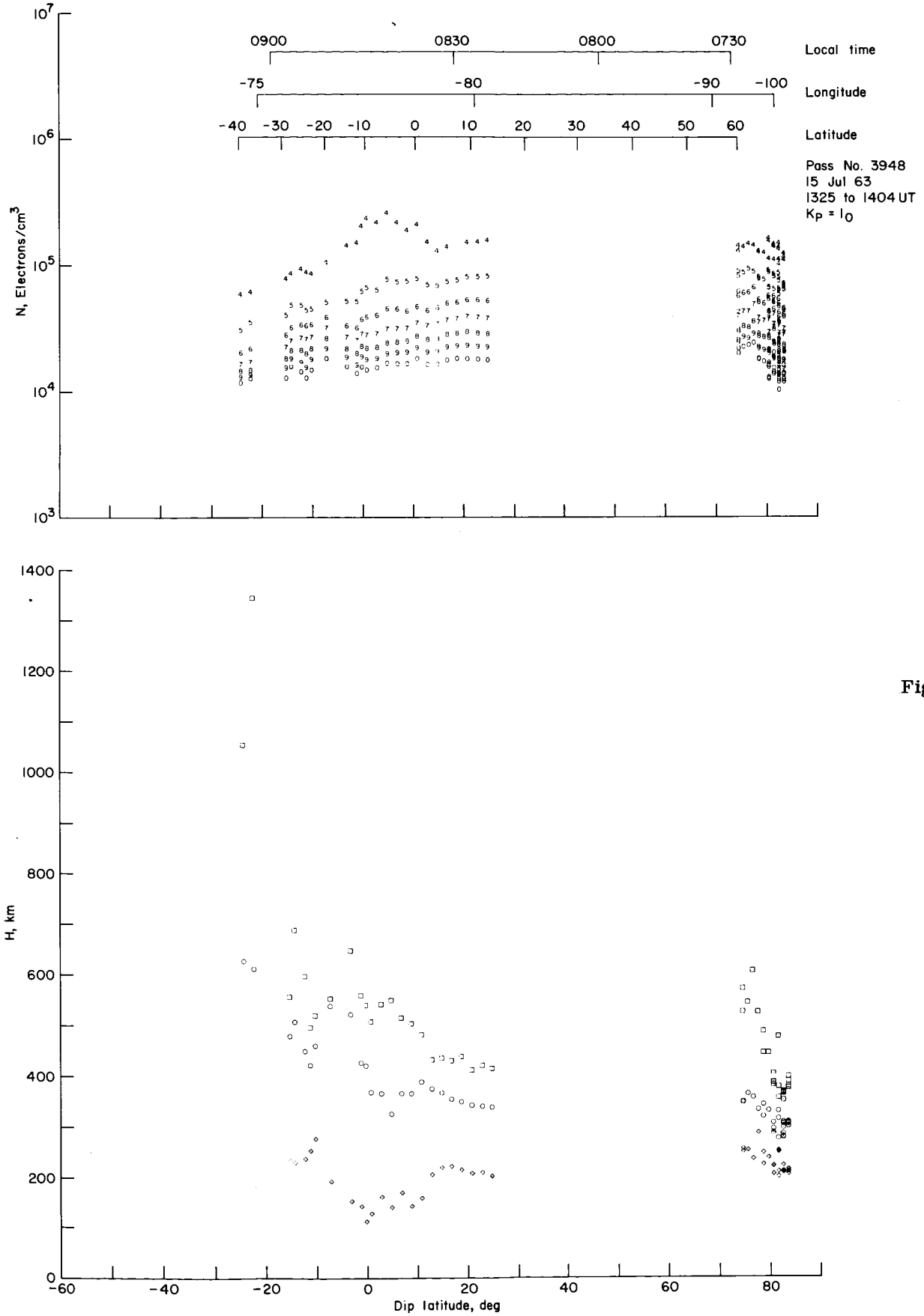

0900
0830
0800
0730
Local time
-75
-80
-90
-100
Longitude
-40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3948
15 Jul 63
1325 to 1404 UT
$K_P = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 126

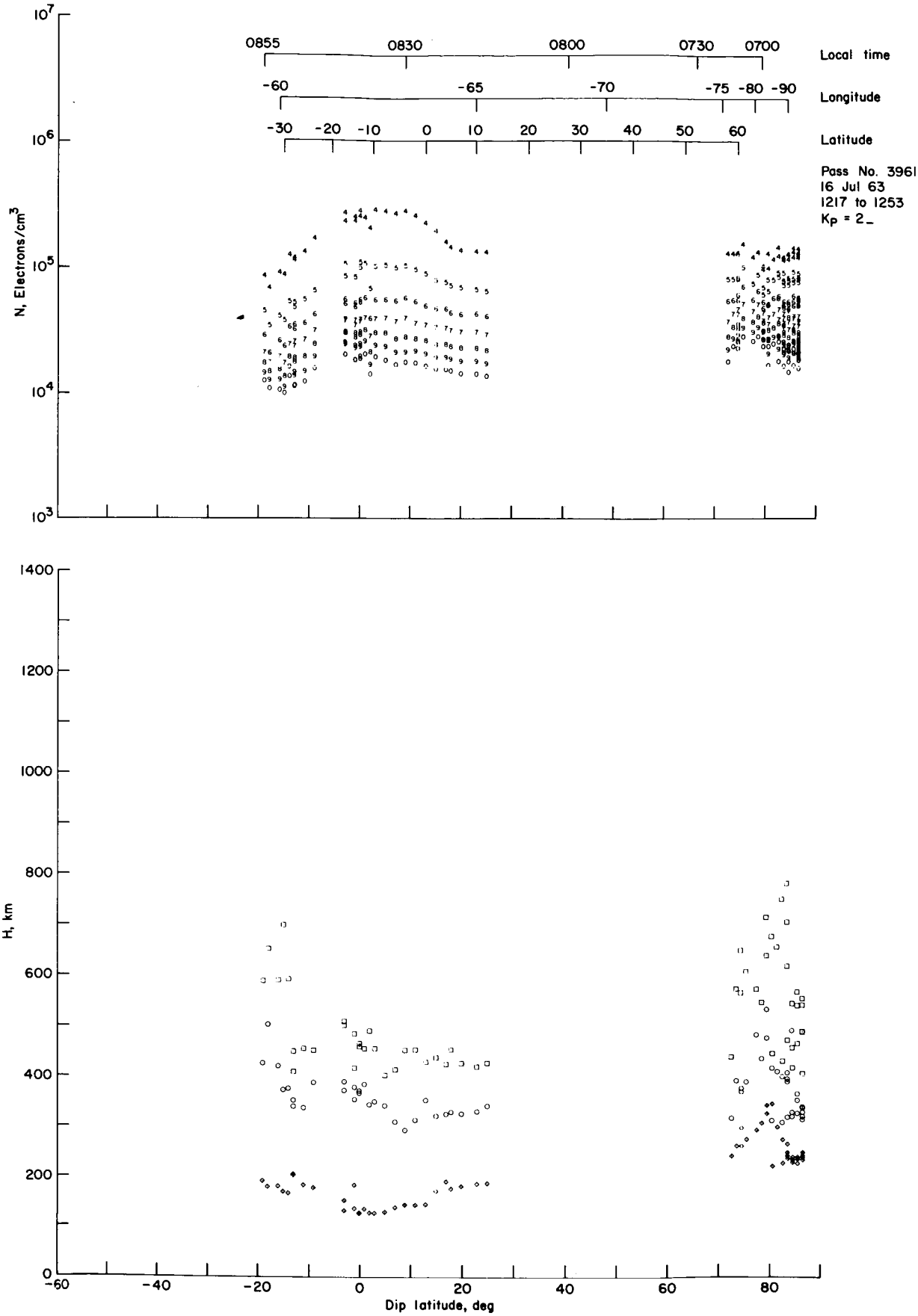

0855
0830
0800
0730
0700
Local time
-60
-65
-70
-75 -80 -90
Longitude
-30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 3961
16 Jul 63
1217 to 1253
Kp = 2_
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 127

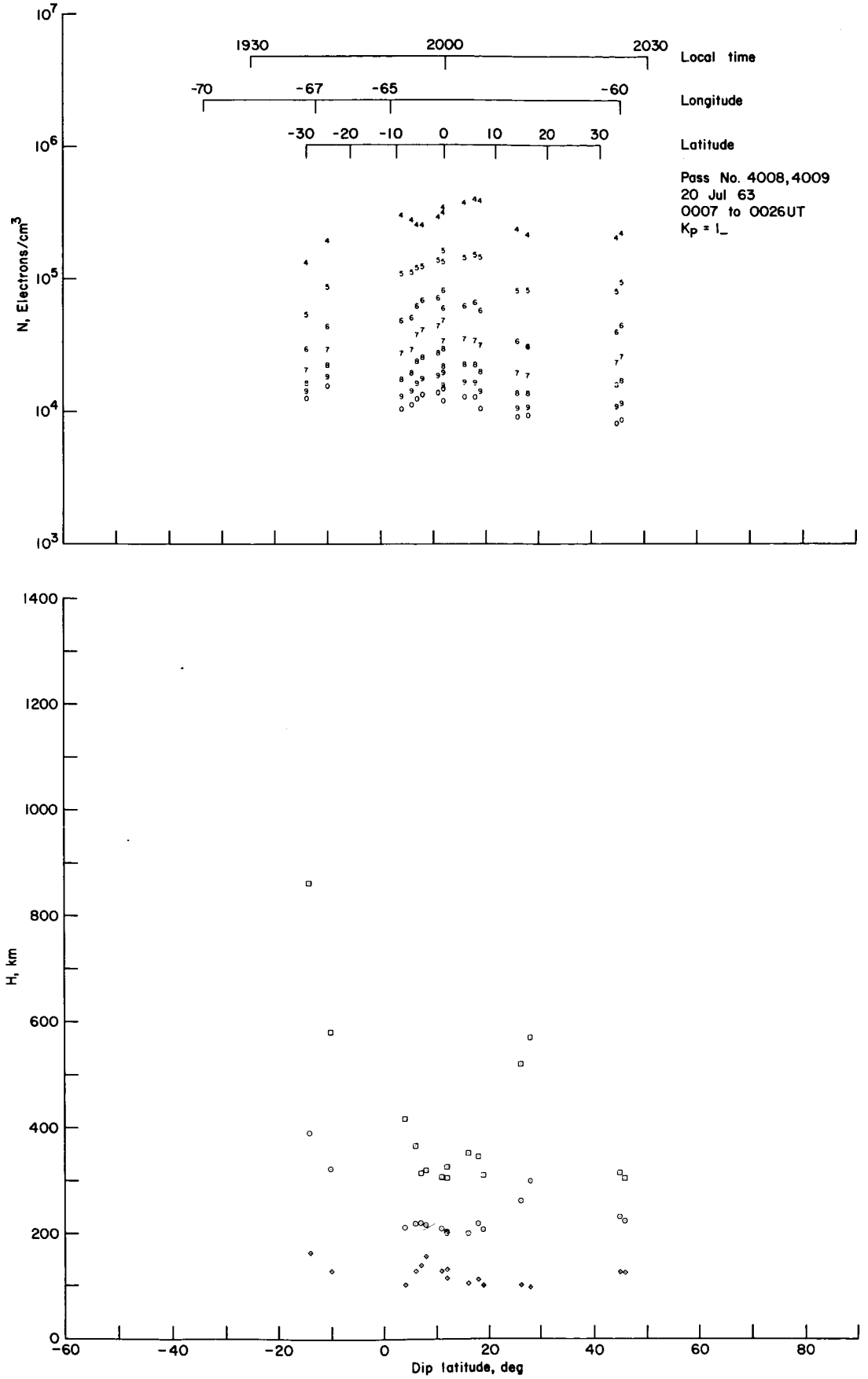

1930
2000
2030
Local time
-70
-67
-65
-60
Longitude
-30
-20
-10
0
10
20
30
Latitude
Pass No. 4008,4009
20 Jul 63
0007 to 0026UT
Kp = 1_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 128

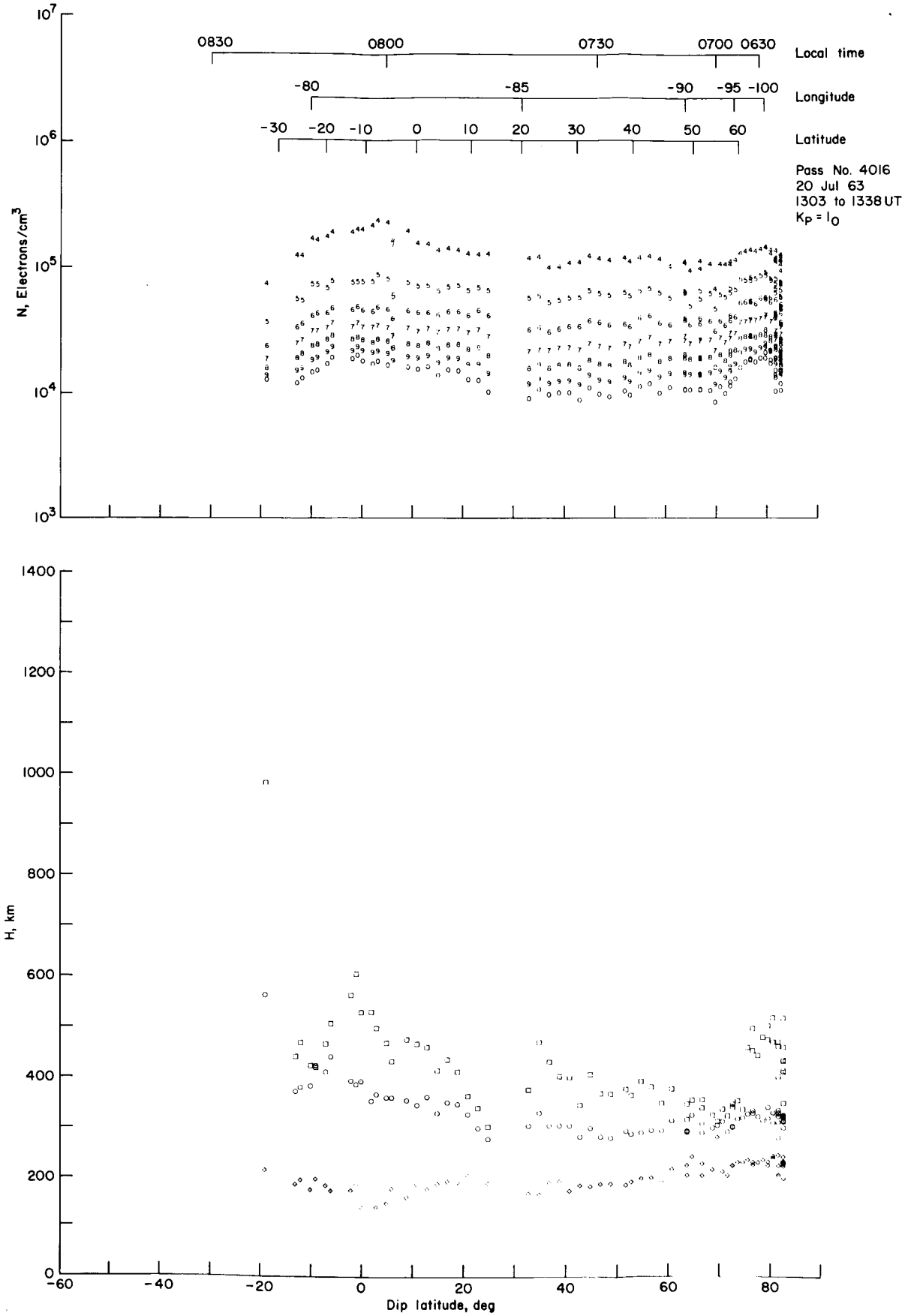

0830
0800
0730
0700 0630
Local time
-80
-85
-90
-95 -100
Longitude
-30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 4016
20 Jul 63
1303 to 1338 UT
$K_P = 1_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 129

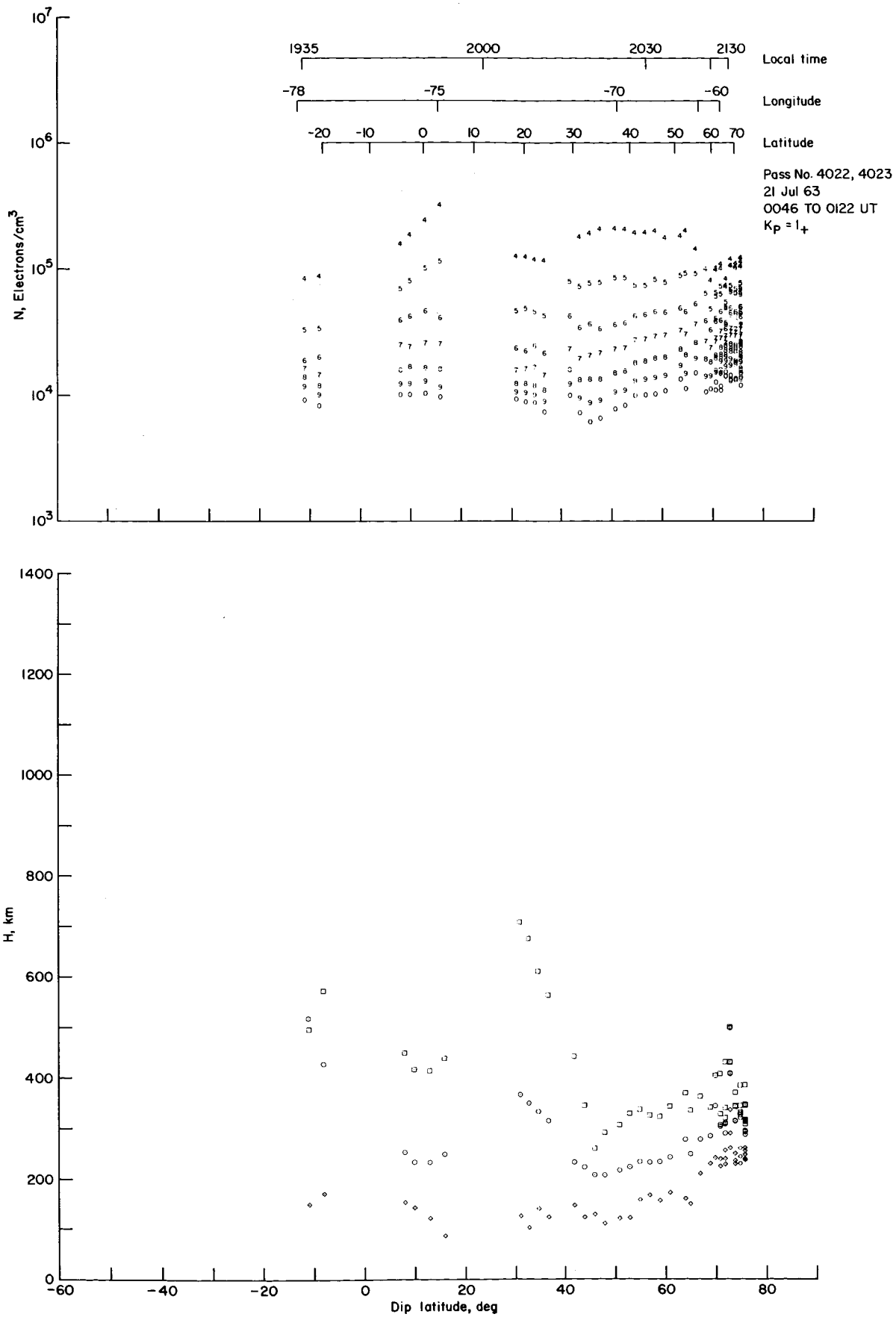

1935
2000
2030
2130
Local time
-78
-75
-70
-60
Longitude
-20
-10
0
10
20
30
40
50
60
70
Latitude
Pass No. 4022, 4023
21 Jul 63
0046 TO 0122 UT
$K_P = 1_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 130

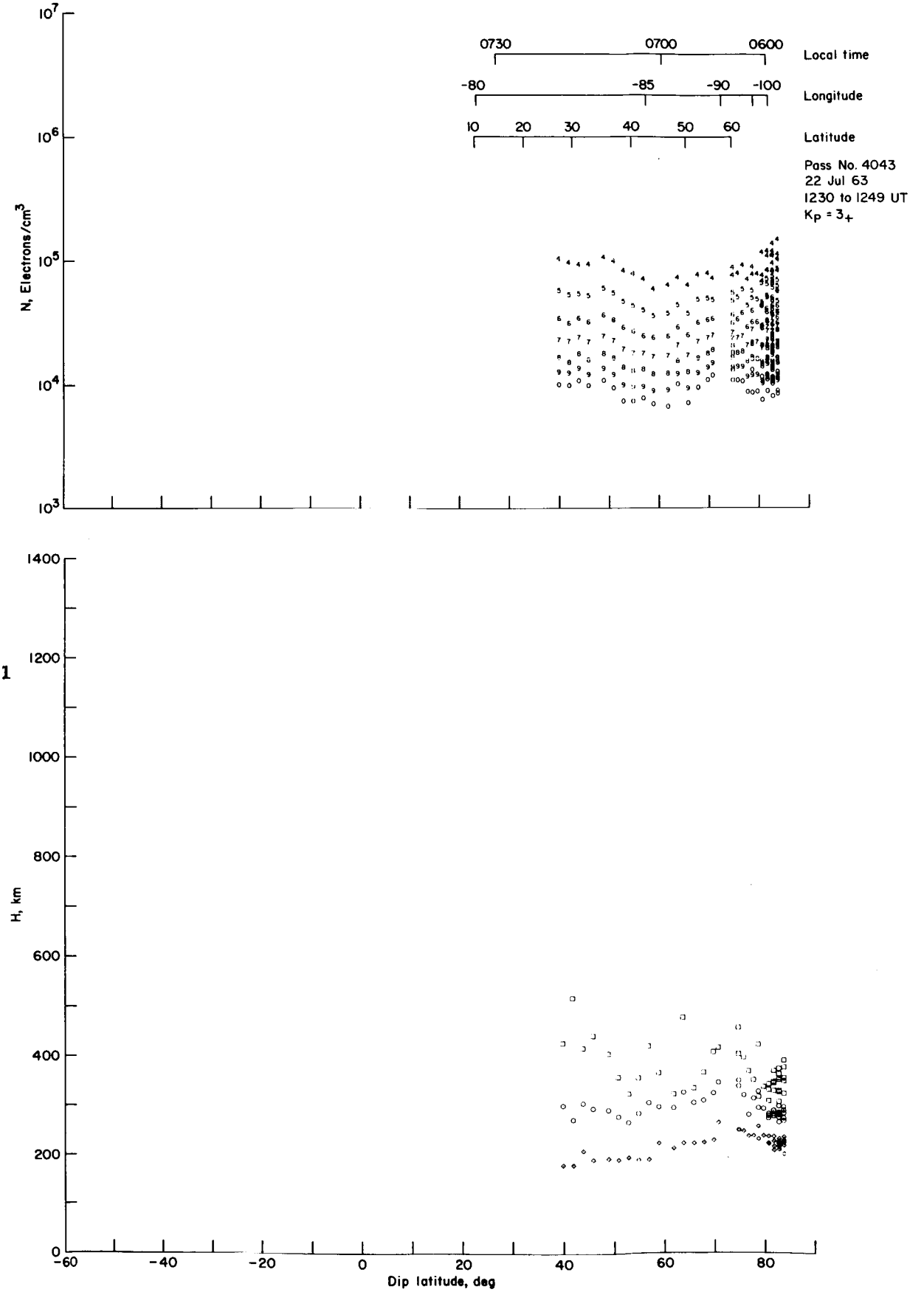

0730
0700
0600
Local time
-80
-85
-90
-100
Longitude
10
20
30
40
50
60
Latitude
Pass No. 4043
22 Jul 63
1230 to 1249 UT
Kp = 3+
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 131

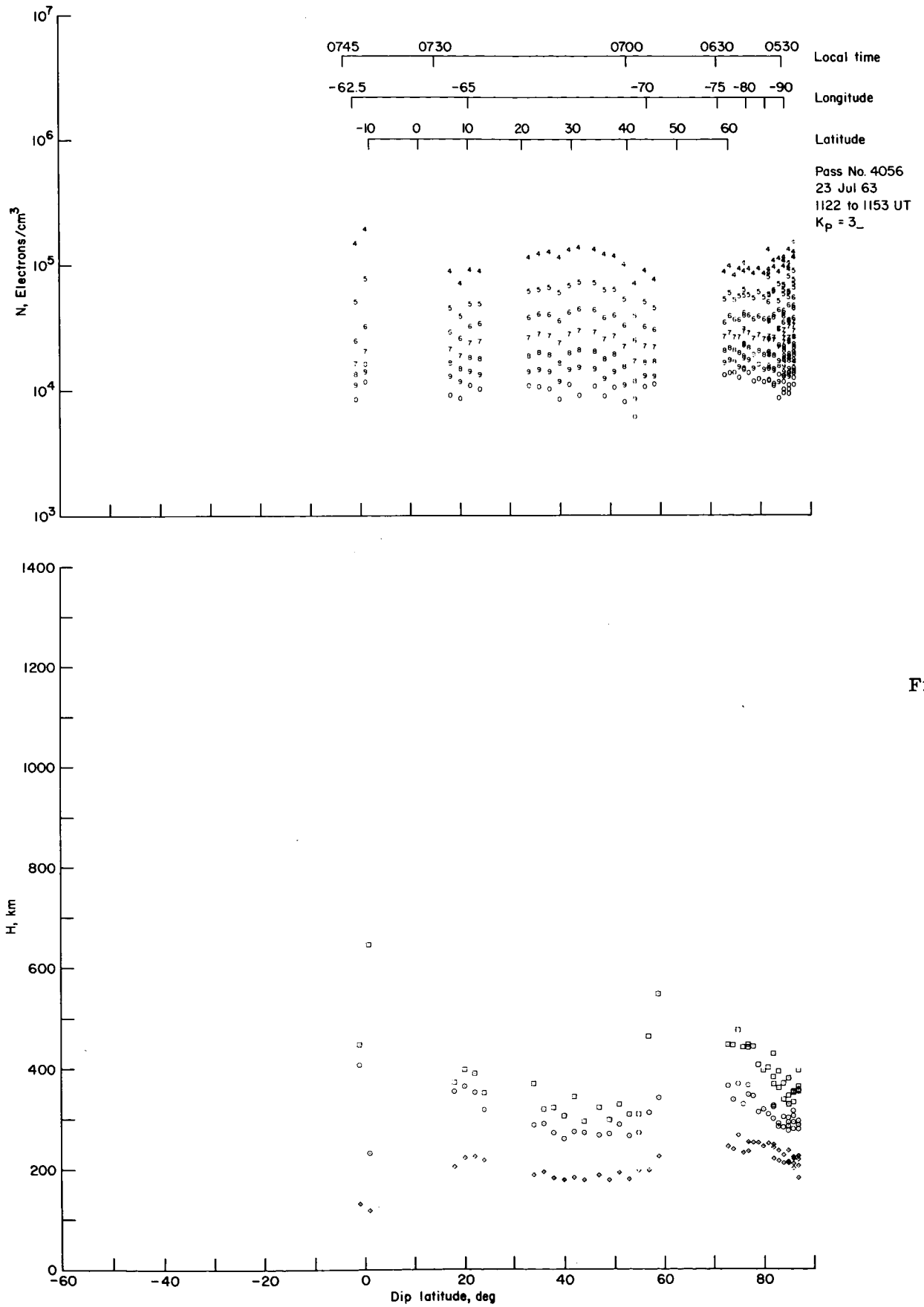

0745
0730
0700
0630
0530
Local time
-62.5
-65
-70
-75
-80
-90
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 4056
23 Jul 63
1122 to 1153 UT
K_p = 3_
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 132

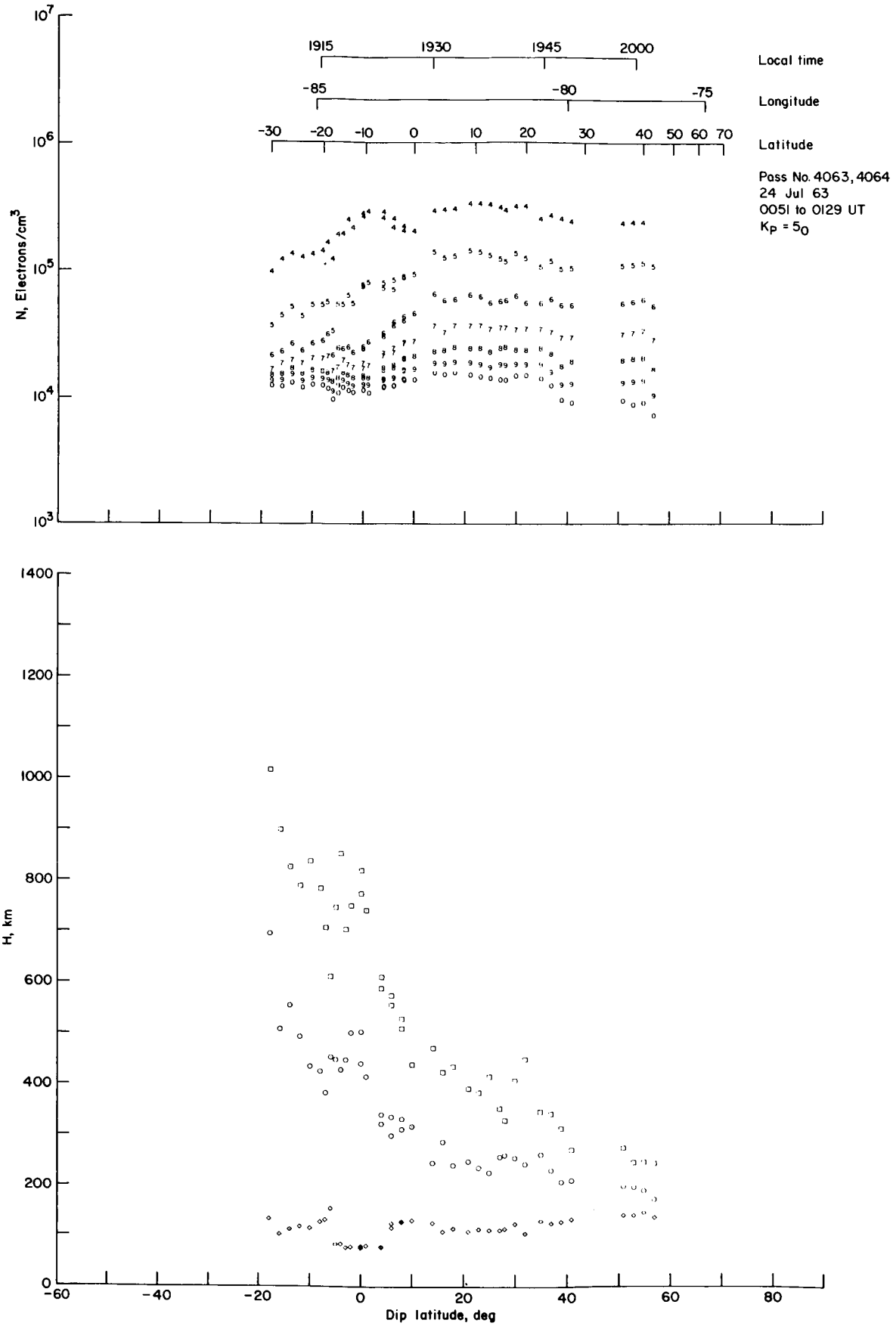
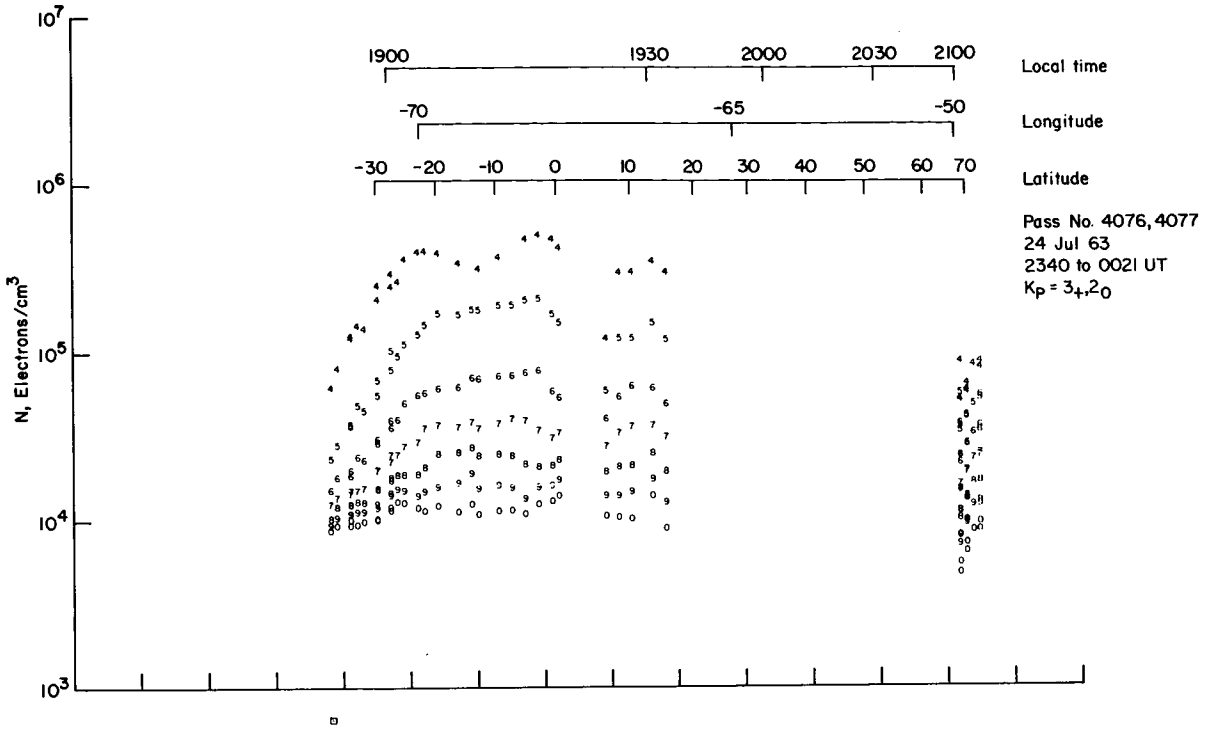

N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
1915
1930
1945
2000
Local time
-85
-80
-75
Longitude
-30
-20
-10
0
10
20
30
40
50
60
70
Latitude
Pass No. 4063, 4064
24 Jul 63
0051 to 0129 UT
Kp = 5₀
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 133


1900
1930
2000
2030
2100
Local time
-70
-65
-50
Longitude
-30 -20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 4076, 4077
24 Jul 63
2340 to 0021 UT
$K_P = 3_+, 2_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3

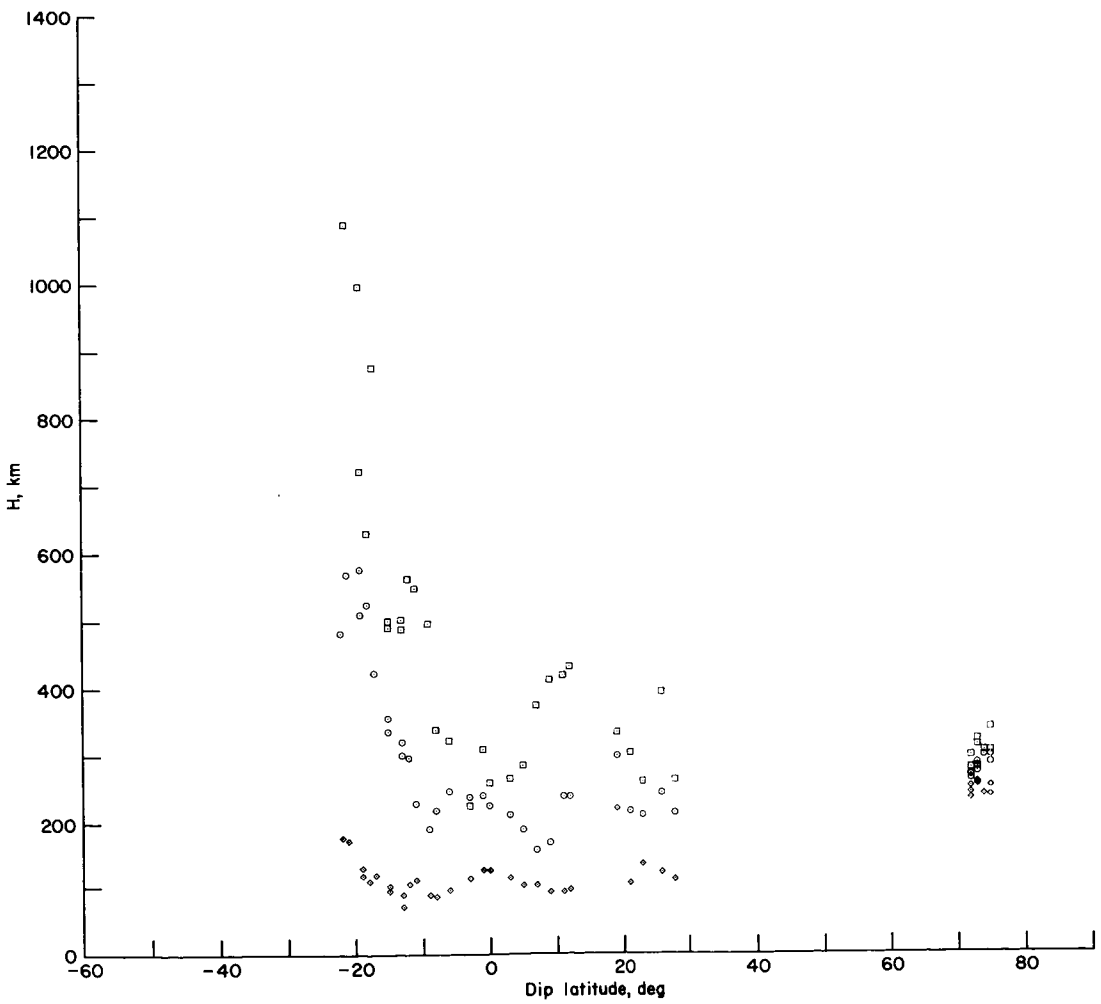

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 134

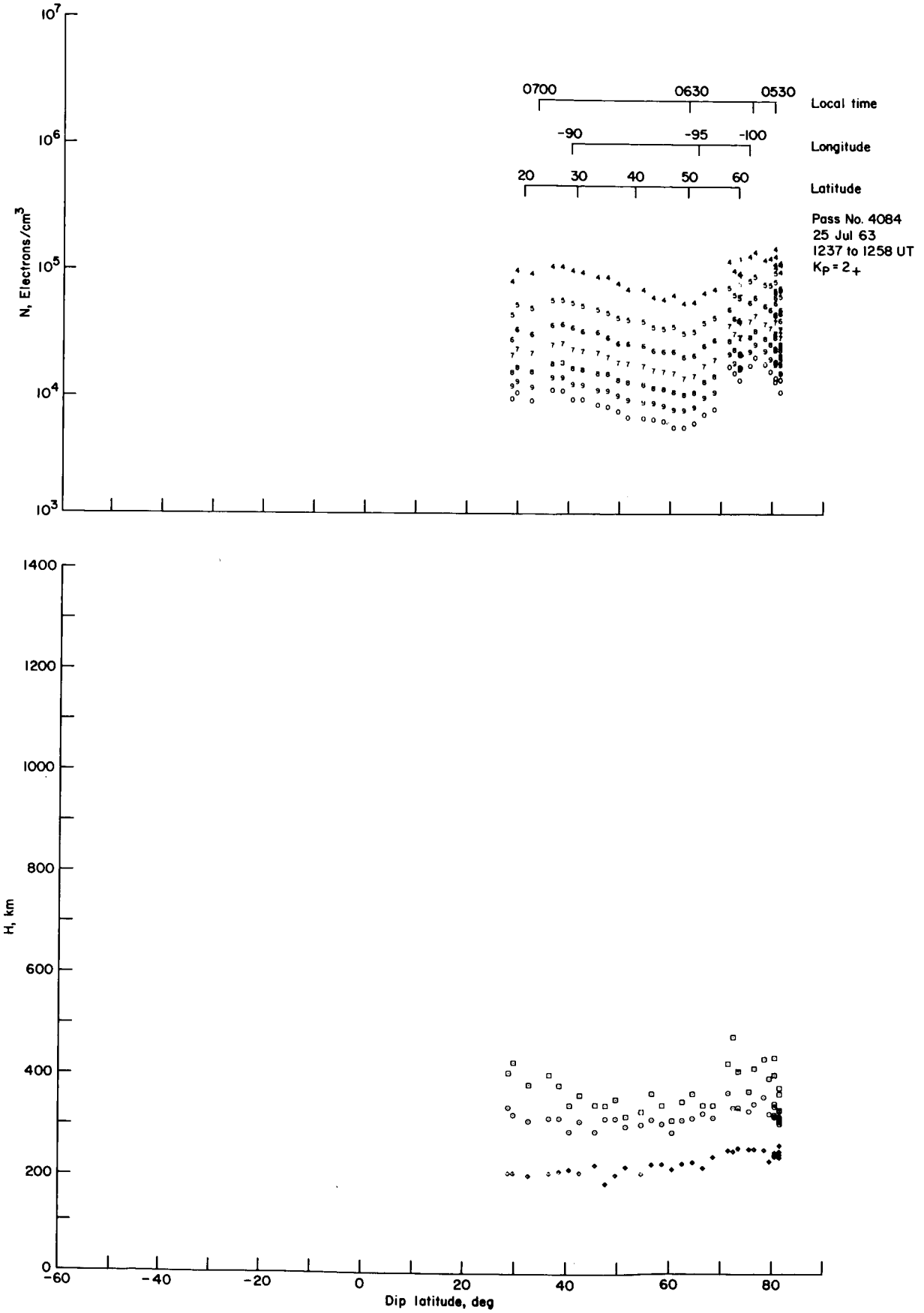

10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
0700
0630
0530
Local time
-90
-95
-100
Longitude
20
30
40
50
60
Latitude
Pass No. 4084
25 Jul 63
1237 to 1258 UT
$K_P = 2_+$
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 135

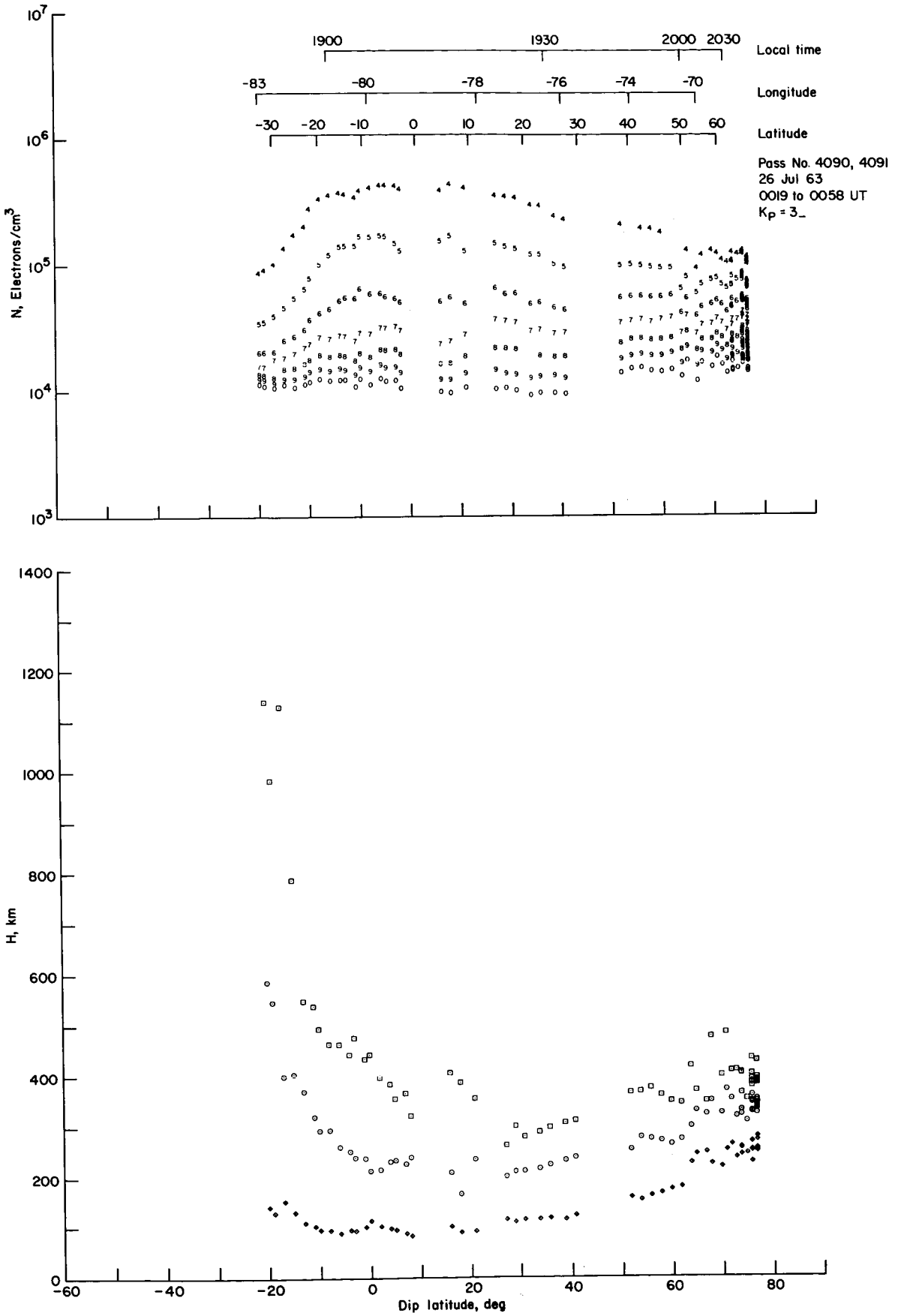

1900
1930
2000 2030
Local time
-83
-80
-78
-76
-74
-70
Longitude
-30
-20
-10
0
10
20
30
40
50
60
Latitude
Pass No. 4090, 4091
26 Jul 63
0019 to 0058 UT
$K_p = 3_-$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 136

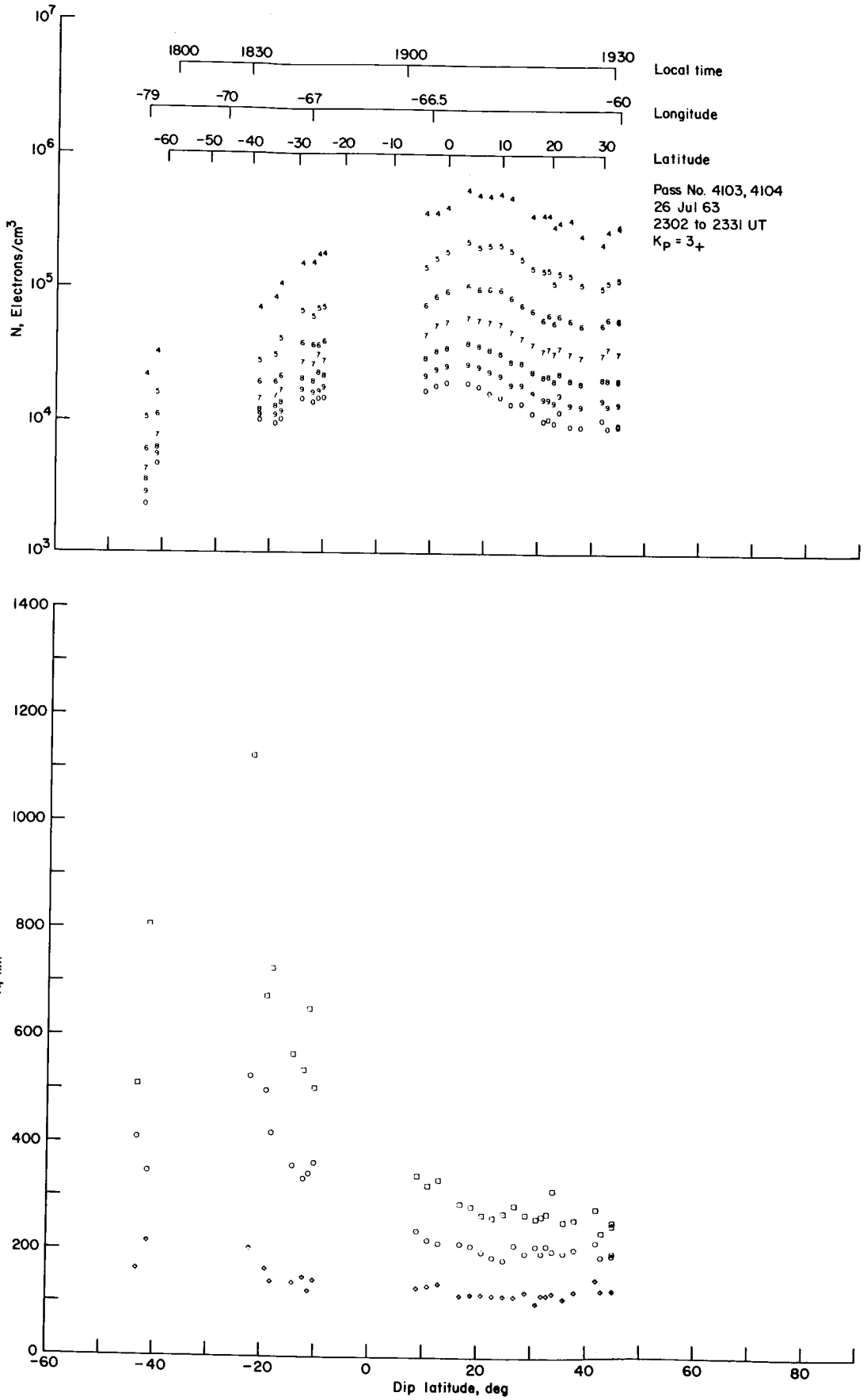

10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1800
1830
1900
1930
Local time
-79
-70
-67
-66.5
-60
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30
Latitude
Pass No. 4103, 4104
26 Jul 63
2302 to 2331 UT
$K_P = 3_+$
1400
1200
1000
800
600
400
200
0
H, km
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 137

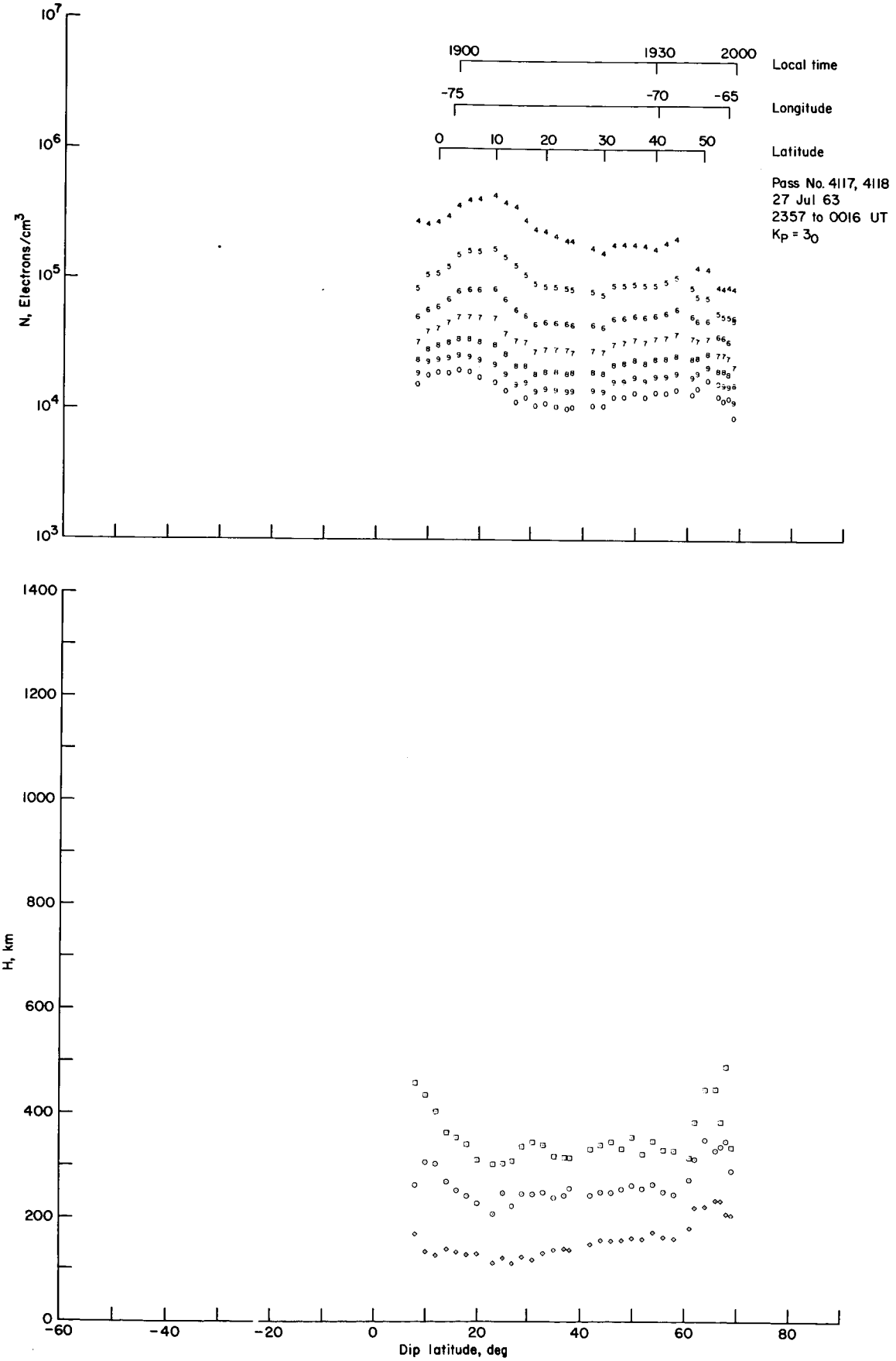

1900
1930
2000
Local time
-75
-70
-65
Longitude
0
10
20
30
40
50
Latitude
Pass No. 4117, 4118
27 Jul 63
2357 to 0016 UT
$K_P = 3_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 138

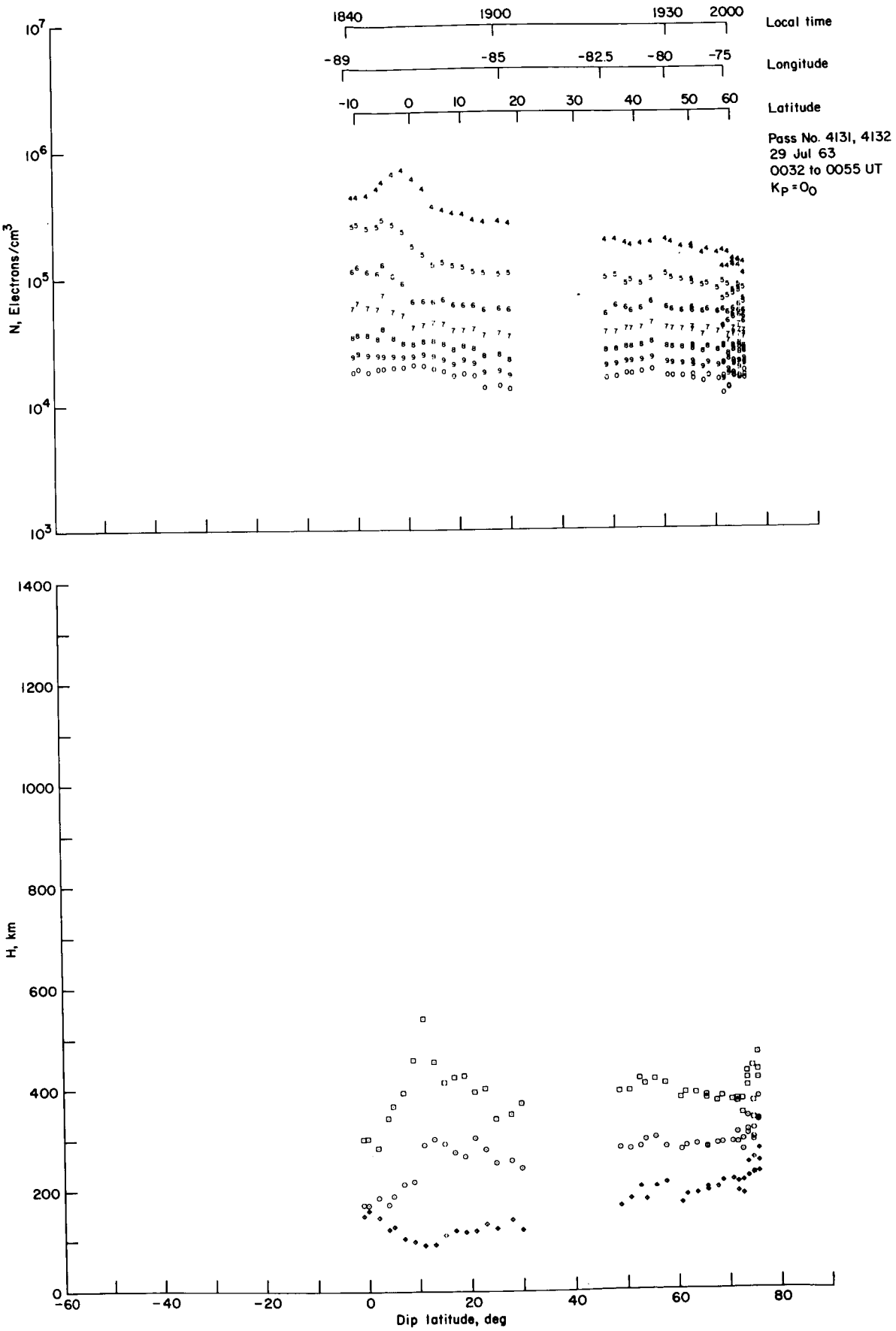

1840
1900
1930
2000
Local time
-89
-85
-82.5
-80
-75
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 4131, 4132
29 Jul 63
0032 to 0055 UT
$K_P = 0_0$
10^7
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 139

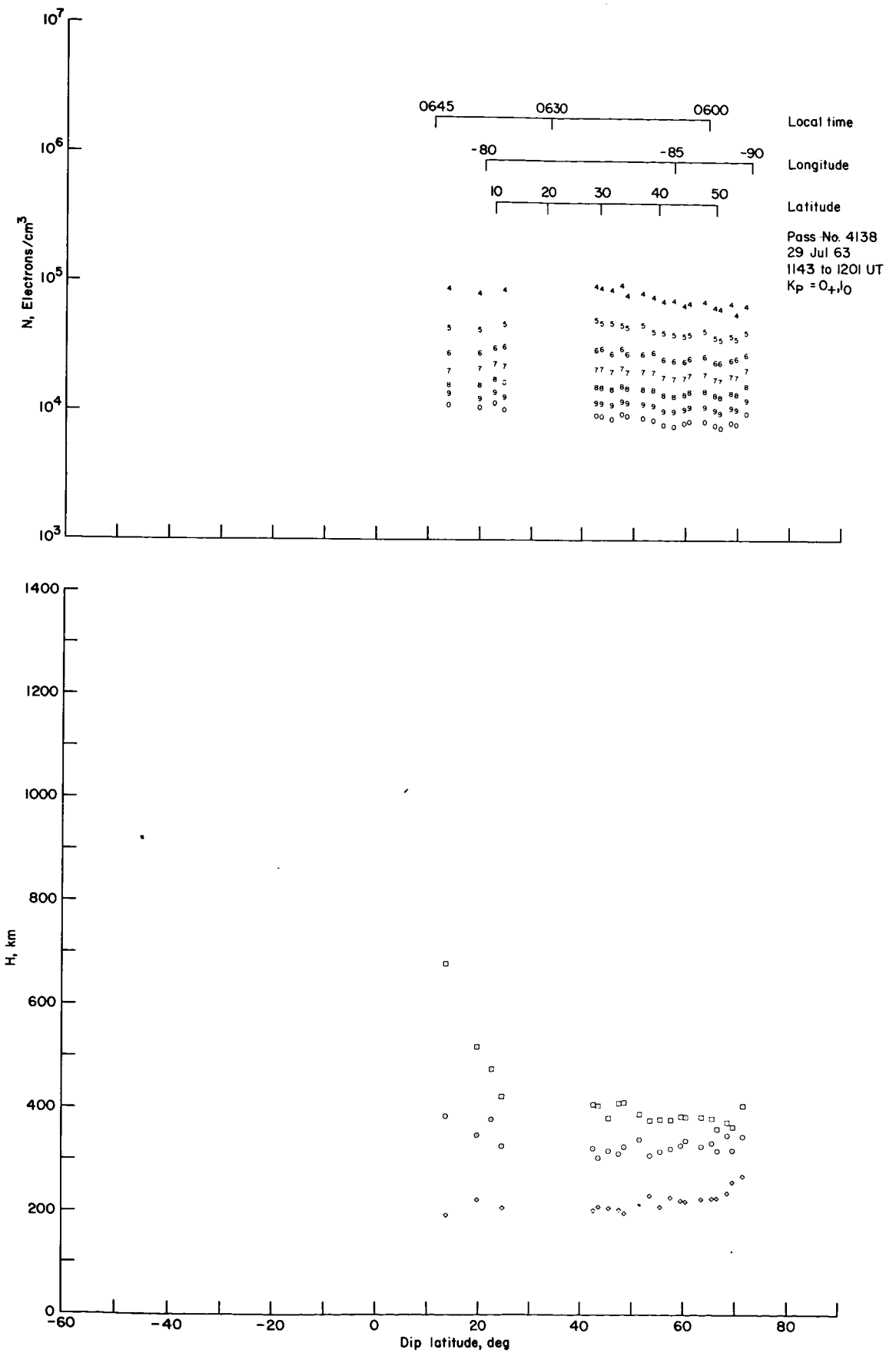

N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
0645
0630
0600
Local time
-80
-85
-90
Longitude
10
20
30
40
50
Latitude
Pass No. 4138
29 Jul 63
1143 to 1201 UT
Kp = 0+,1o
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 140

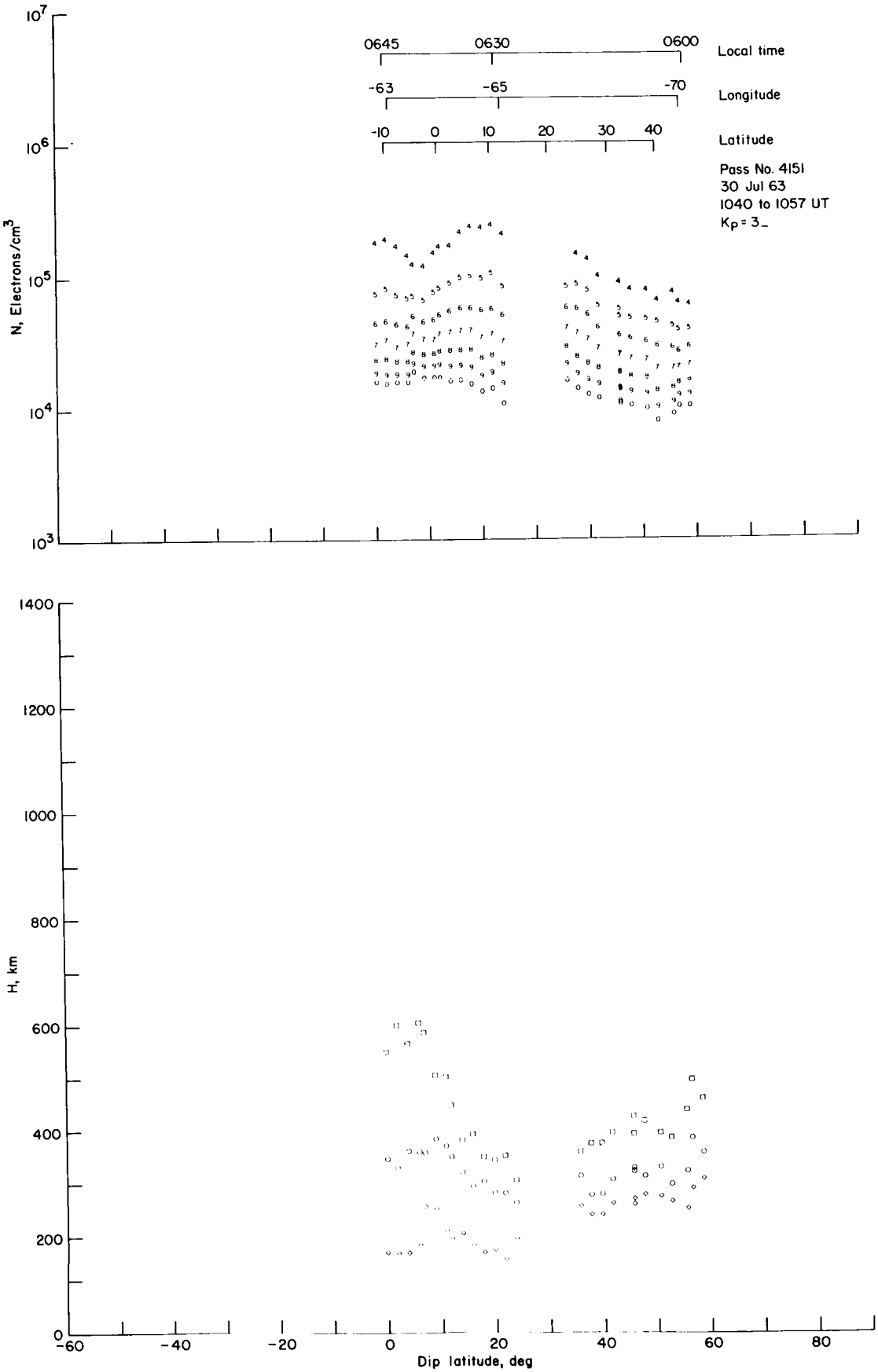

0645
0630
0600
Local time
-63
-65
-70
Longitude
-10
0
10
20
30
40
Latitude
Pass No. 4151
30 Jul 63
1040 to 1057 UT
Kp = 3-
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 141

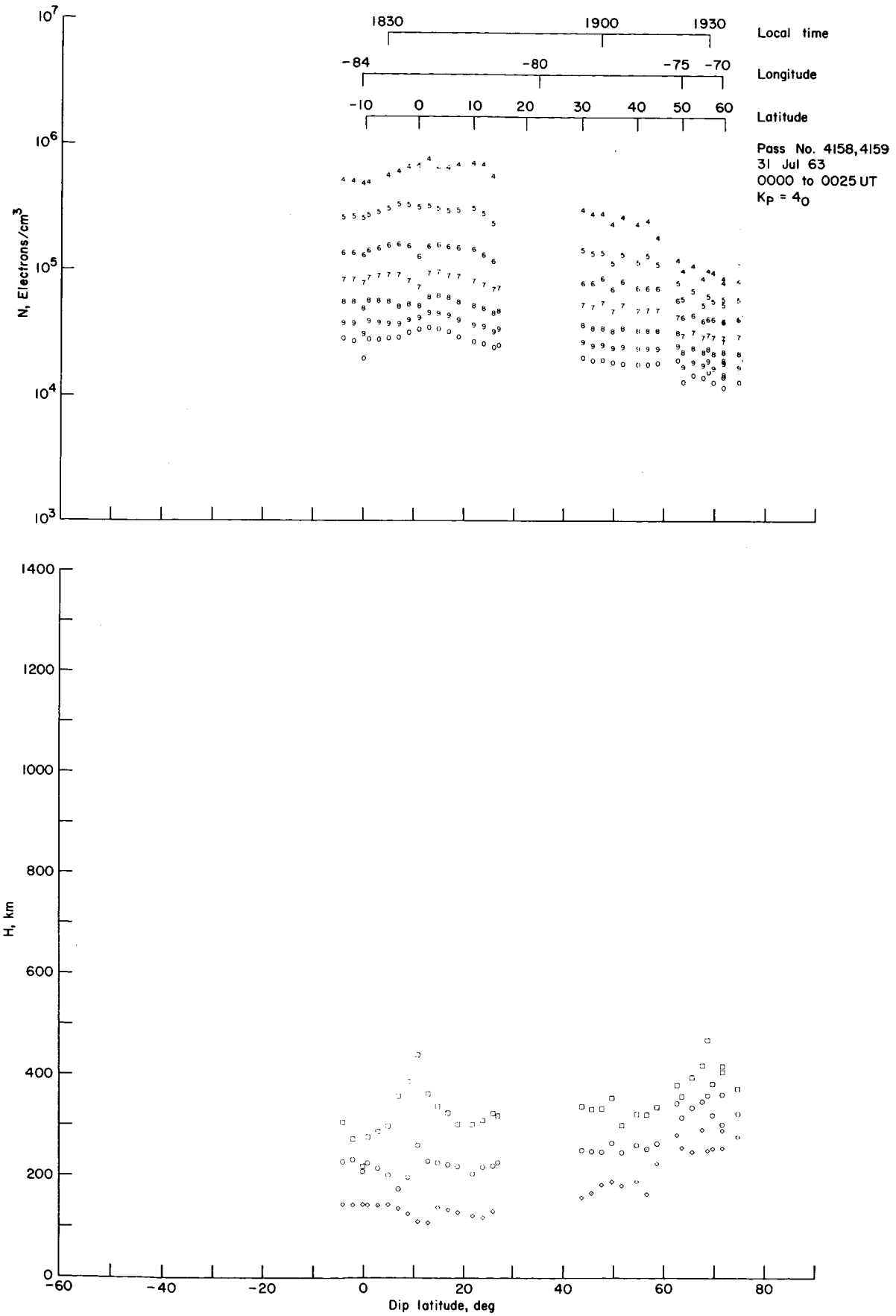

1830
1900
1930
Local time
-84
-80
-75
-70
Longitude
-10
0
10
20
30
40
50
60
Latitude
Pass No. 4158,4159
31 Jul 63
0000 to 0025 UT
Kp = 4o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 142

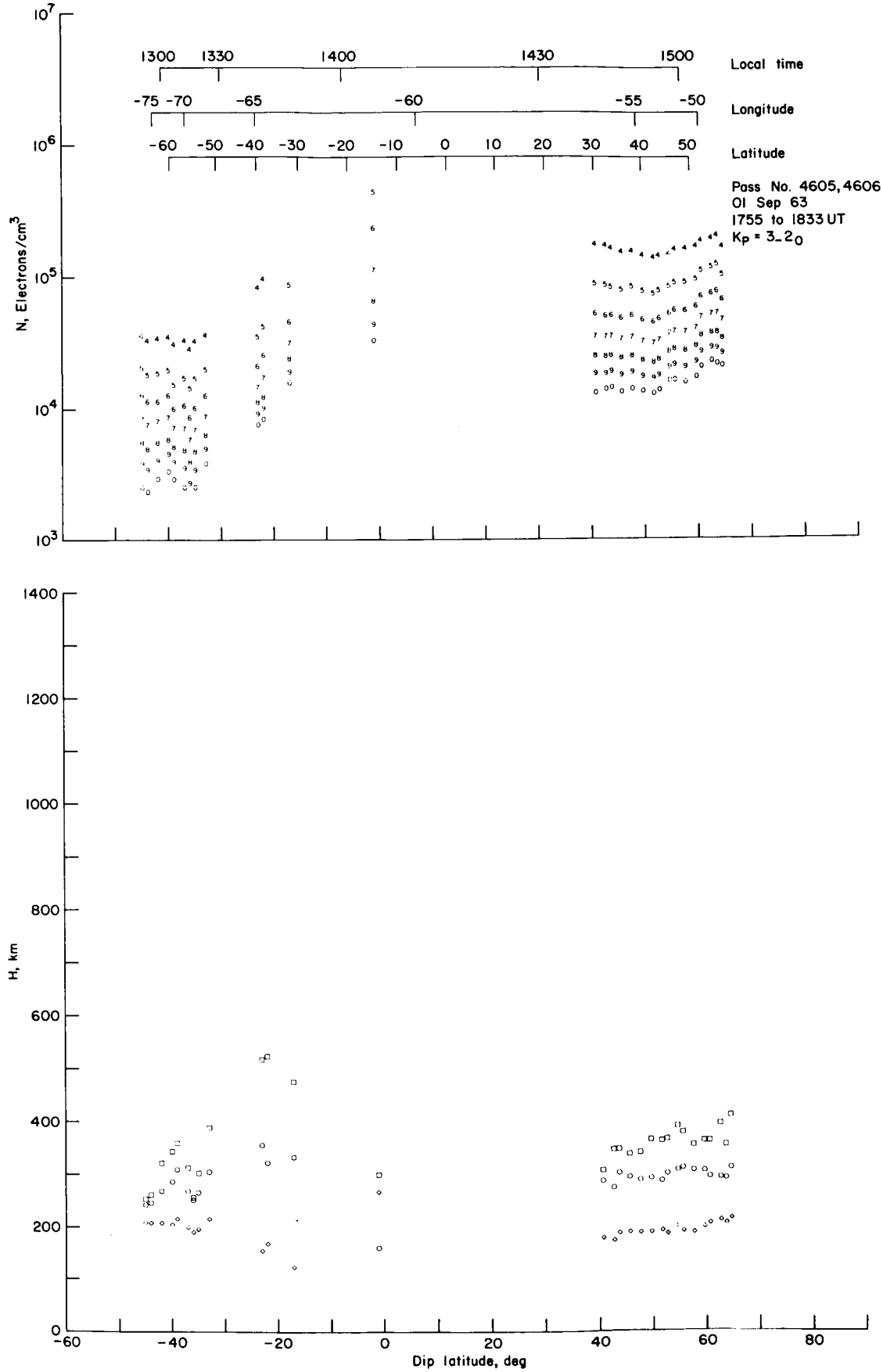

1300 1330 1400 1430 1500
Local time
-75 -70 -65 -60 -55 -50
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 4605, 4606
01 Sep 63
1755 to 1833 UT
Kp = 3-2o
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 143

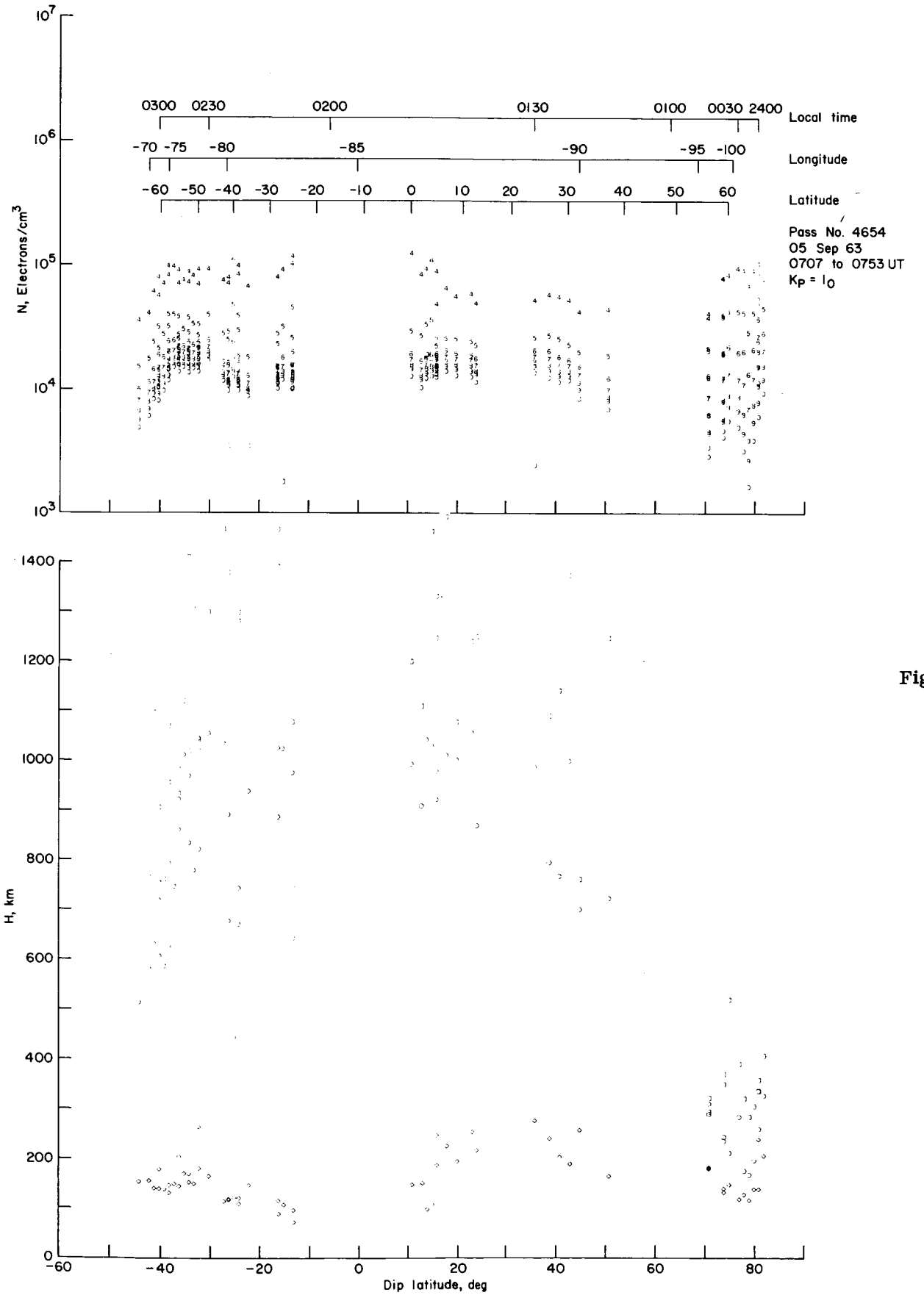

0300 0230 0200 0130 0100 0030 2400
Local time
-70 -75 -80 -85 -90 -95 -100
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 4654
05 Sep 63
0707 to 0753 UT
$K_P = 1_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 144

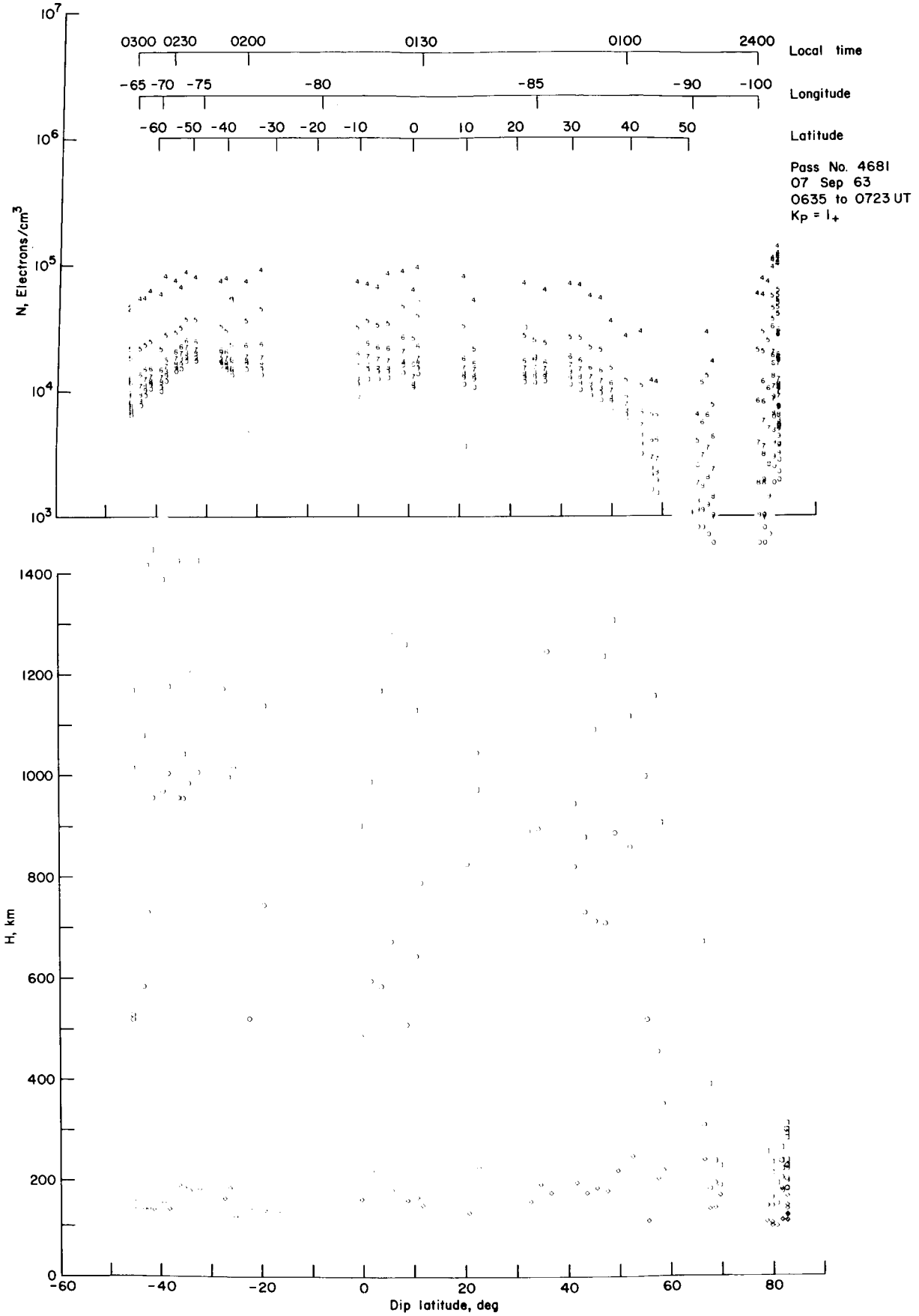

0300 0230 0200 0130 0100 2400
Local time
-65 -70 -75 -80 -85 -90 -100
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 4681
07 Sep 63
0635 to 0723 UT
Kp = 1+
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 145

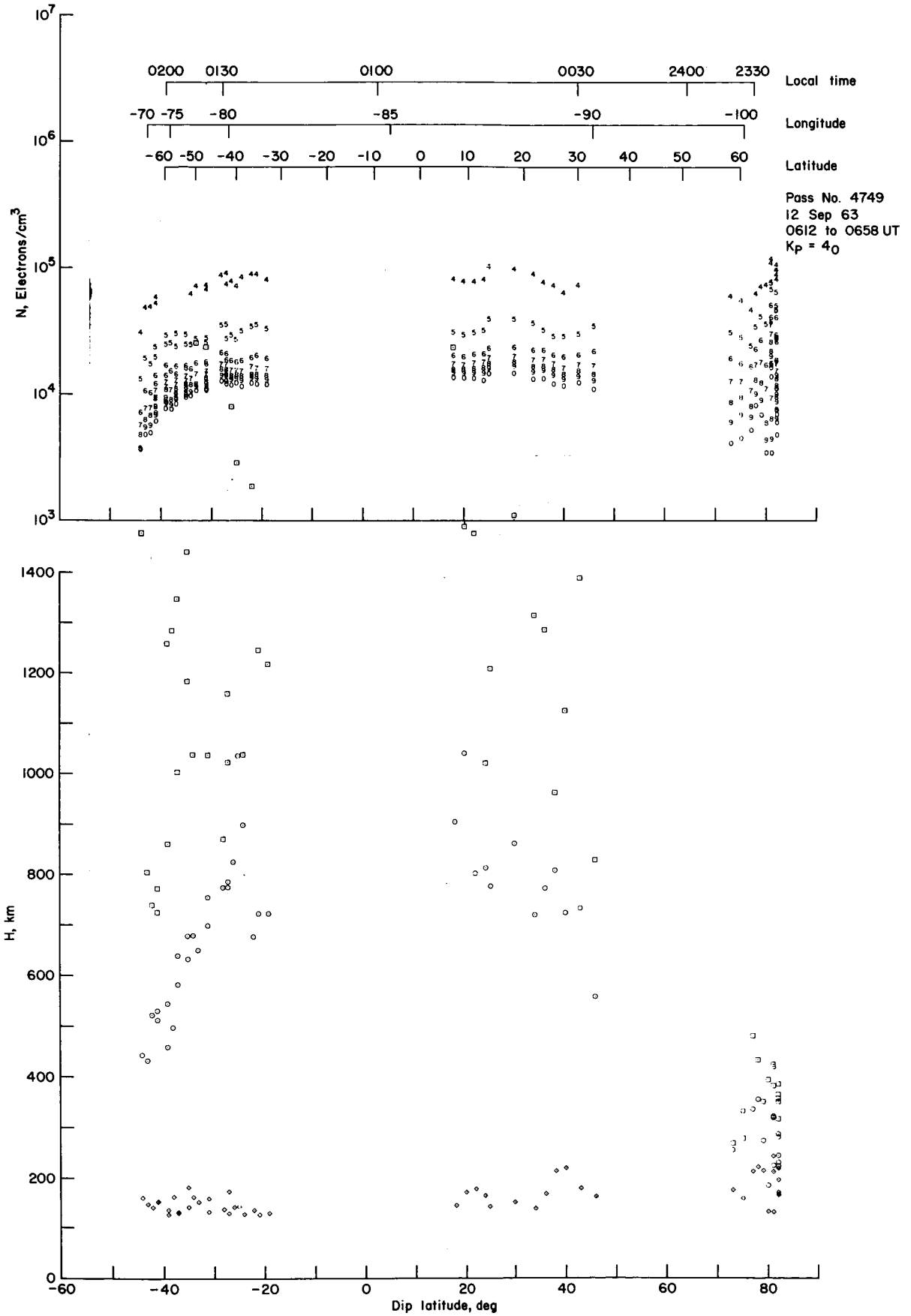

0200 0130 0100 0030 2400 2330
Local time
-70 -75 -80 -85 -90 -100
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 4749
12 Sep 63
0612 to 0658 UT
$K_P = 4_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 146

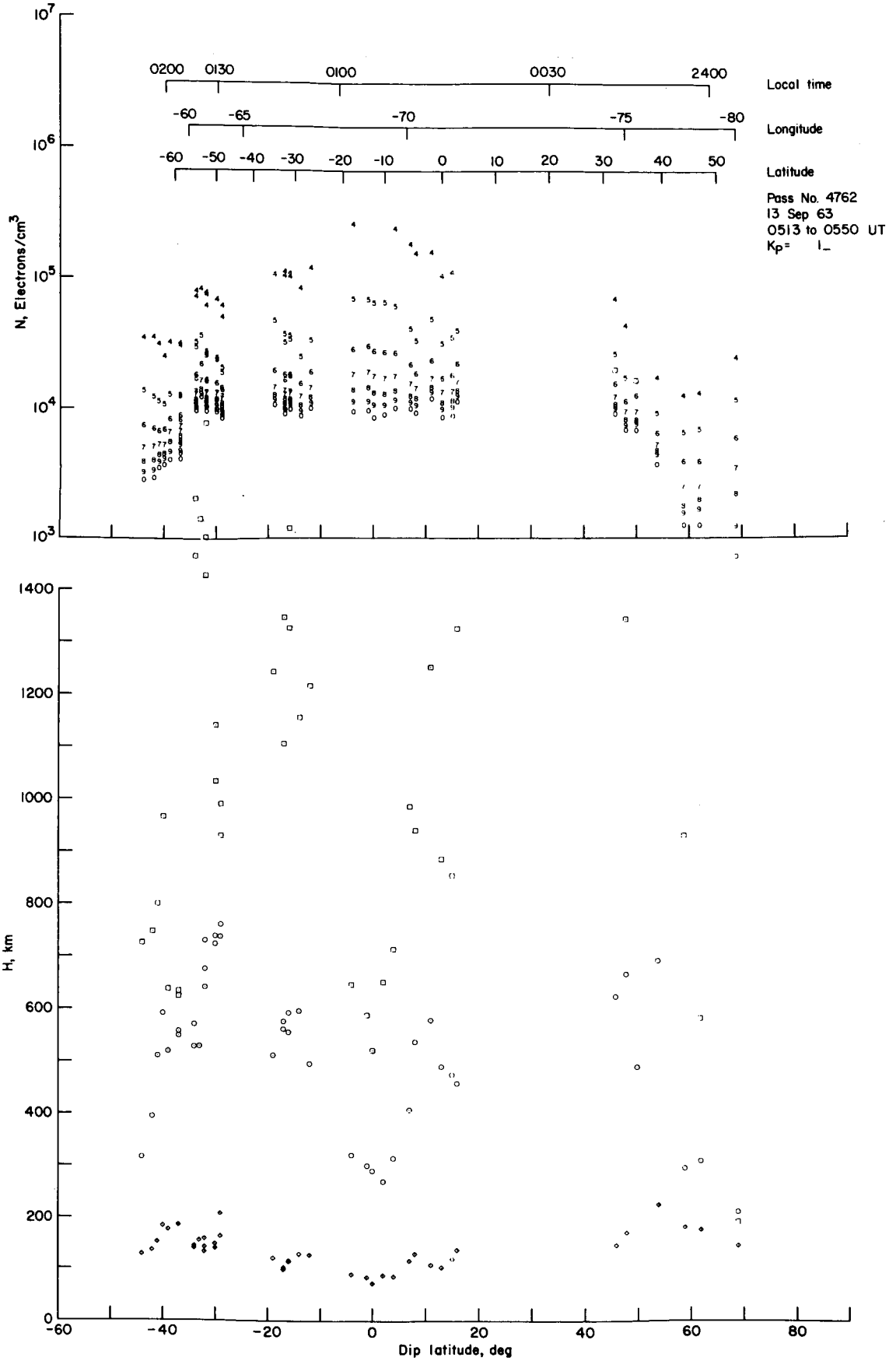

0200 0130 0100 0030 2400
Local time
-60 -65 -70 -75 -80
Longitude
-60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 4762
13 Sep 63
0513 to 0550 UT
Kp= 1-
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 147

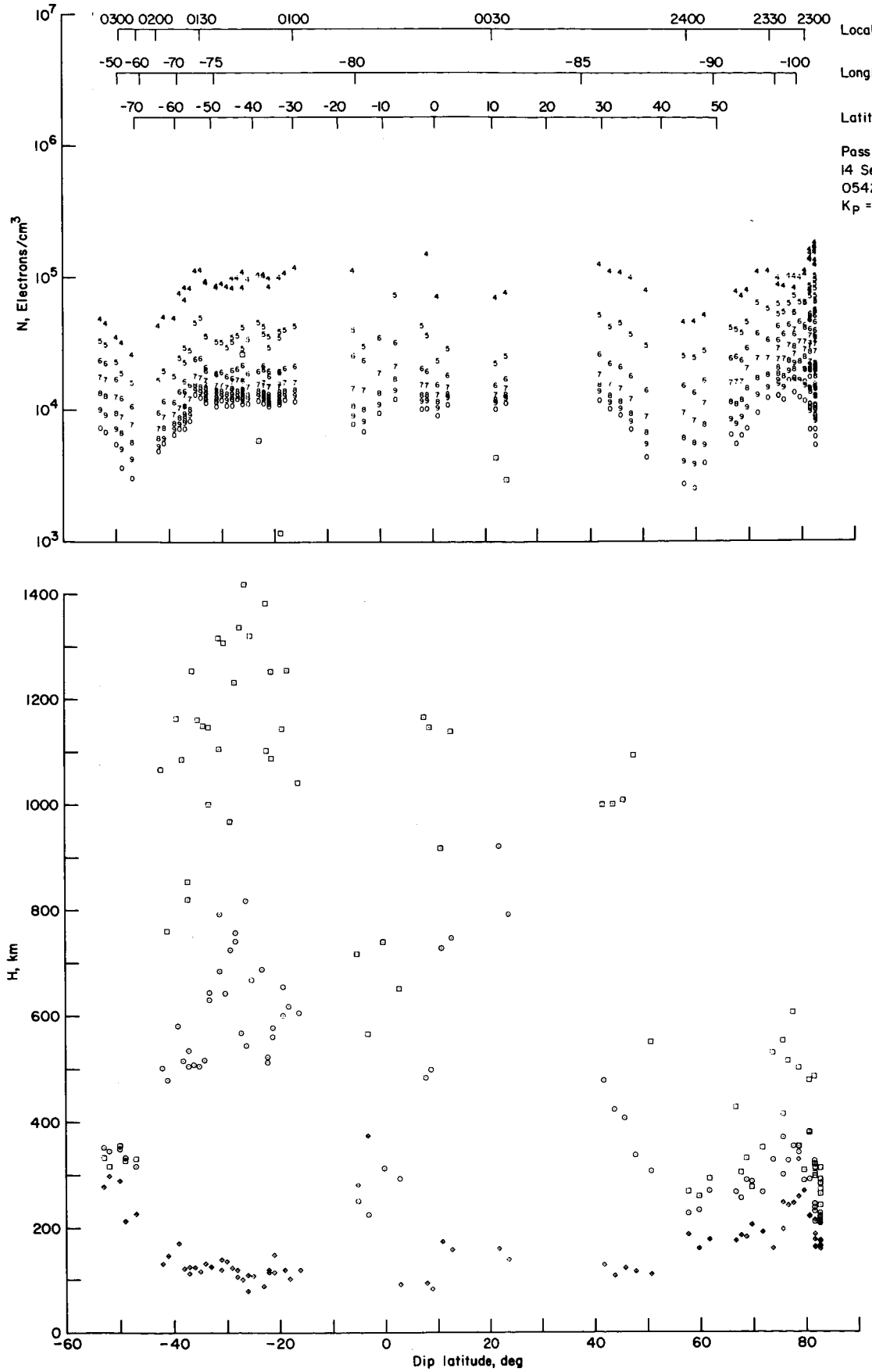

0300 0200 0130 0100 0030 2400 2330 2300
Local time
-50 -60 -70 -75 -80 -85 -90 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50
Latitude
Pass No. 4776
14 Sep 63
0542 to 0631 UT
$K_P = 5_+7_0$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 148

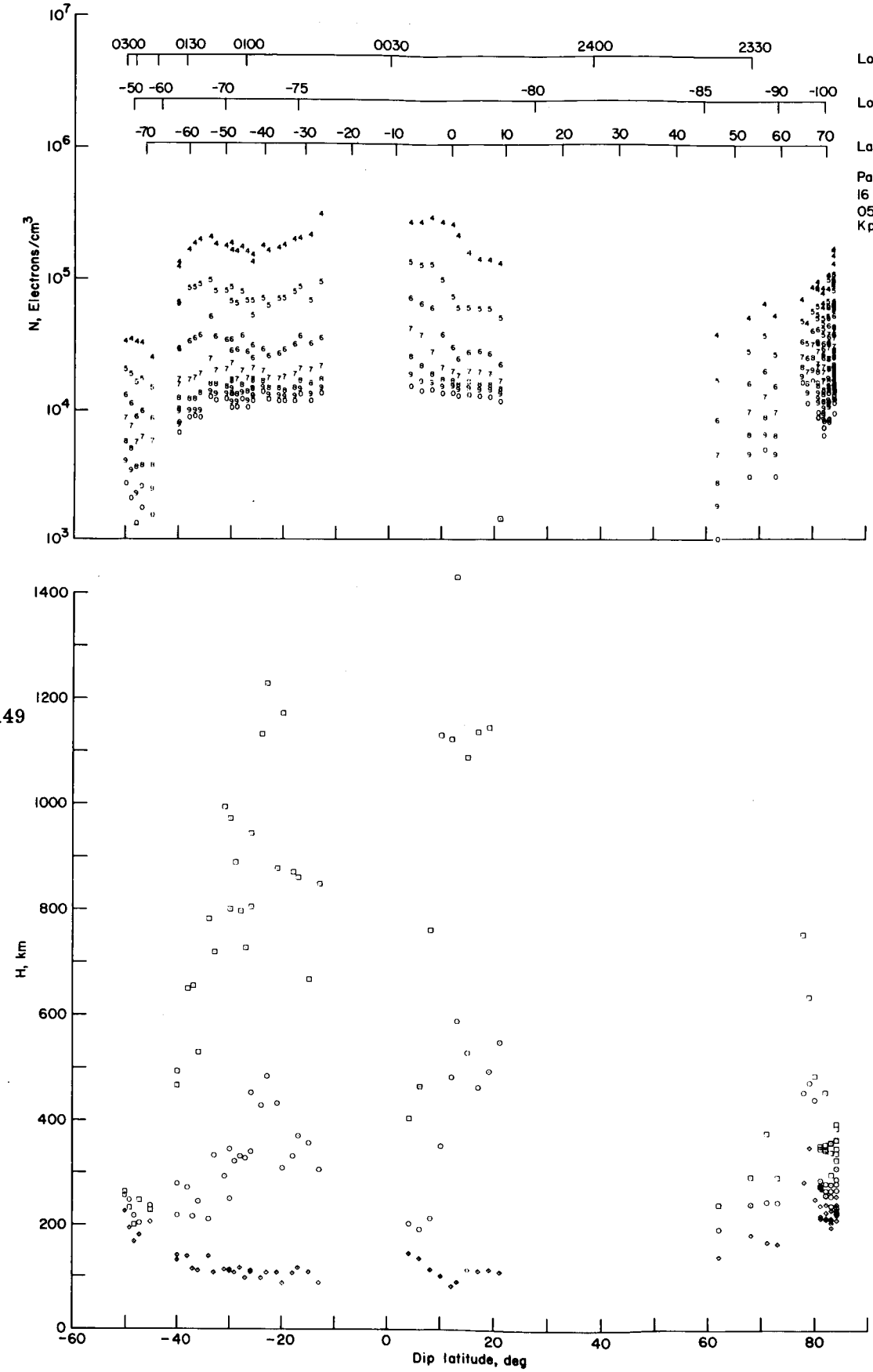

0300
0130
0100
0030
2400
2330
Local time
-50 -60 -70 -75 -80 -85 -90 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70
Latitude
Pass No. 4803
16 Sep 63
0509 to 0559 UT
Kp = 5_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 149

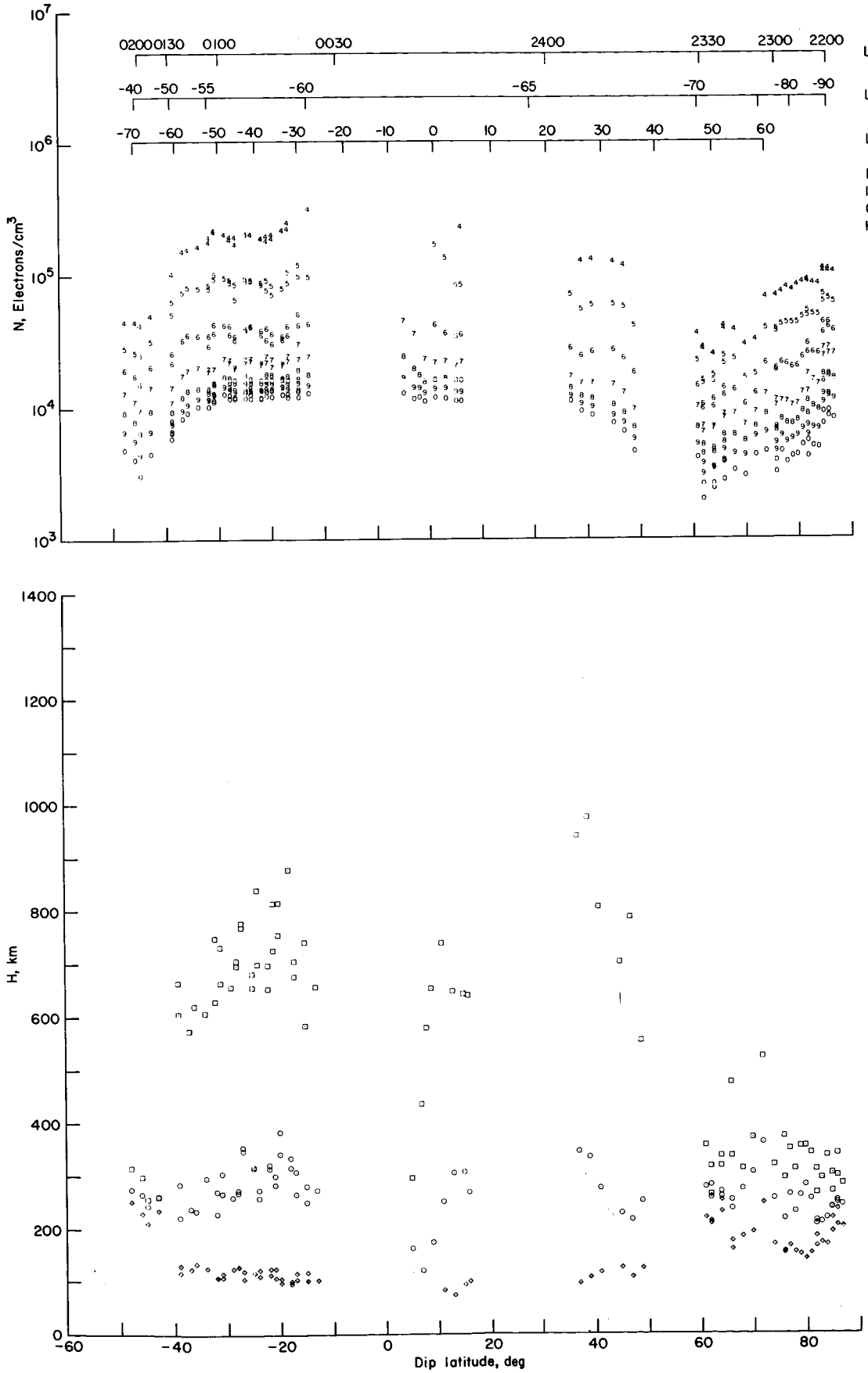

Local time
0200 0130 0100 0030 2400 2330 2300 2200
Longitude
-40 -50 -55 -60 -65 -70 -80 -90
Latitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Pass No. 4816
17 Sep 63
0405 to 0450 UT
$K_P = 4_+$
N, Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 150

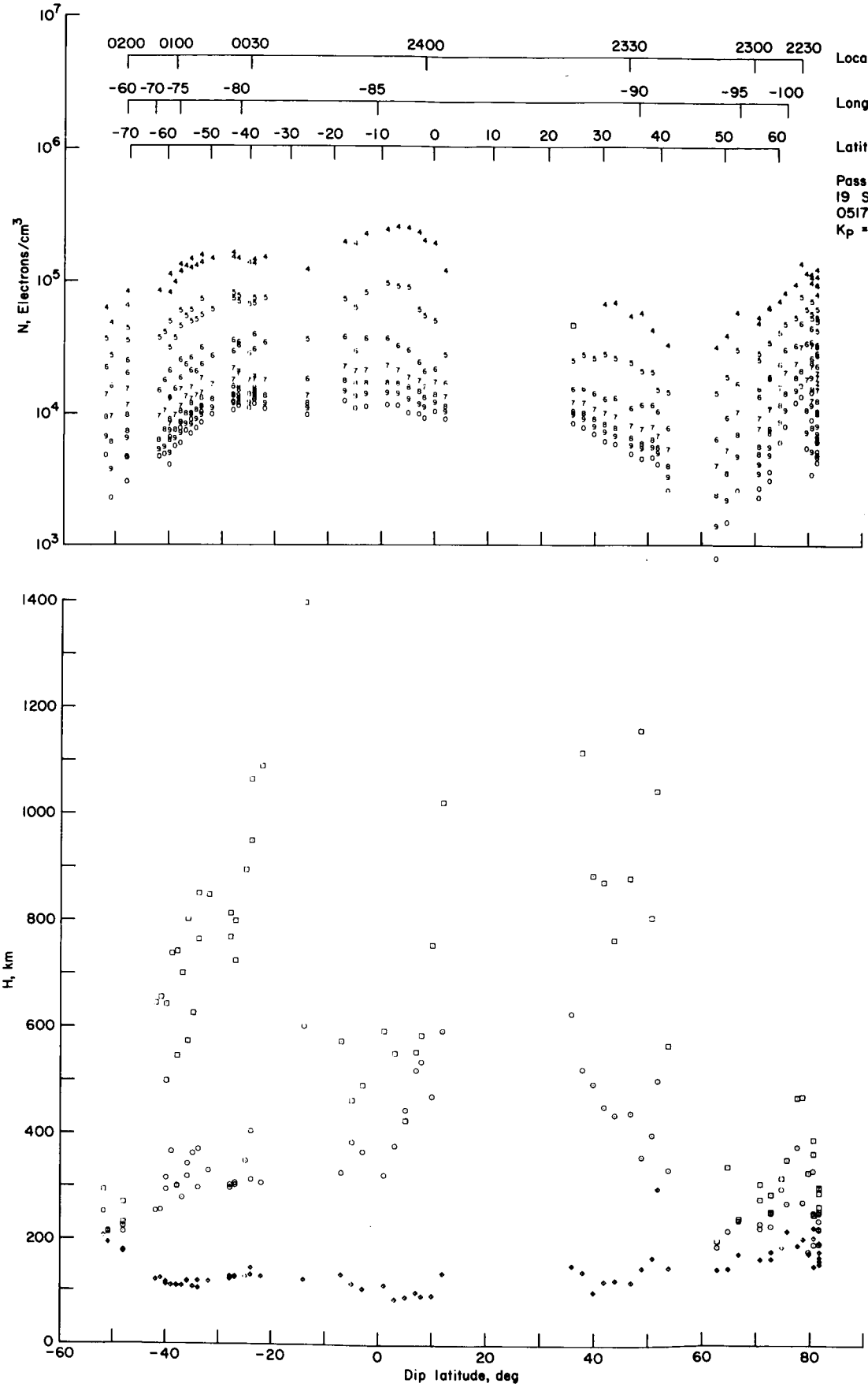

0200 0100 0030 2400 2330 2300 2230
Local time
-60 -70 -75 -80 -85 -90 -95 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 4844
19 Sep 63
0517 to 0606 UT
Kp = 4₀4₊
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 151

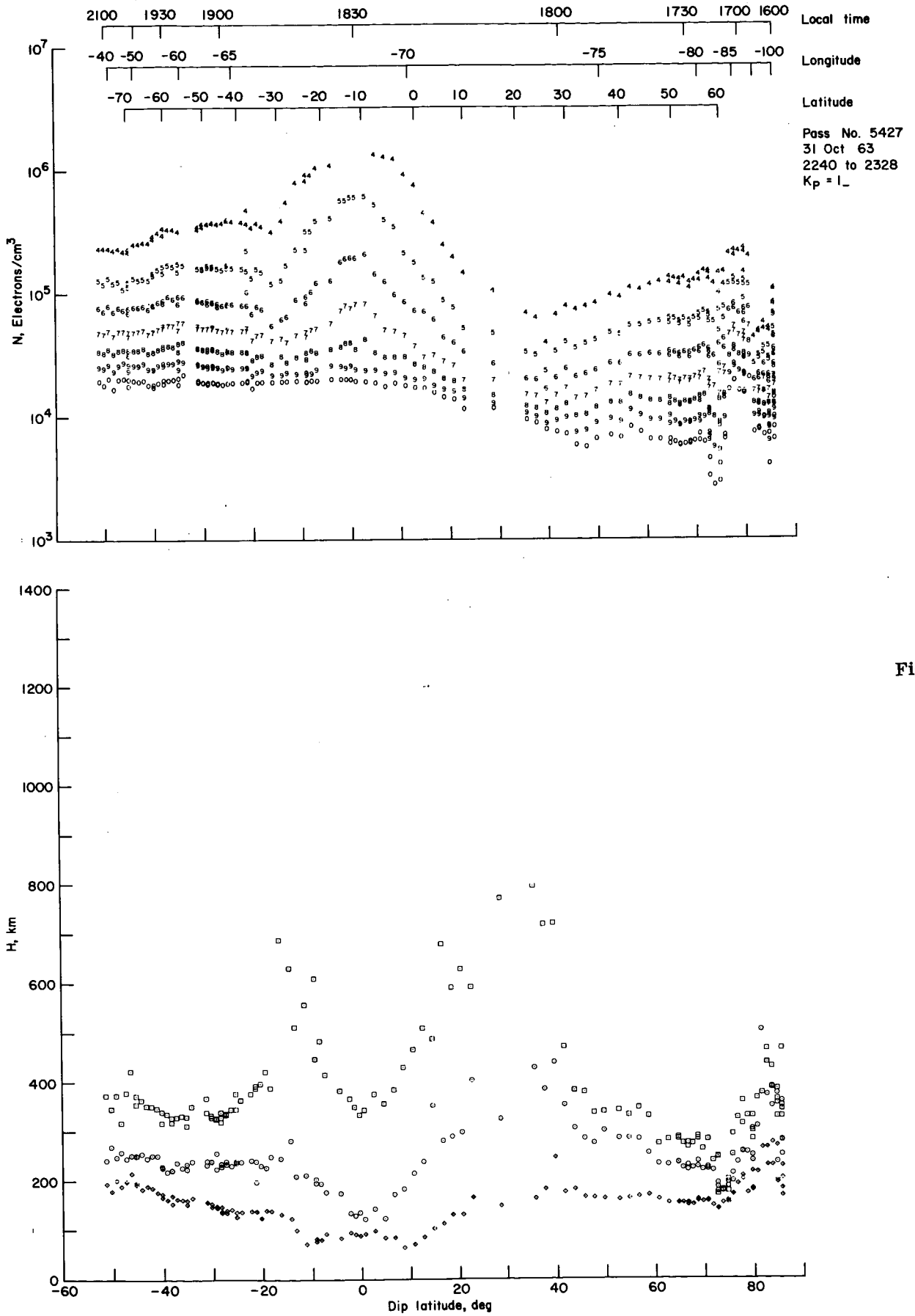

2100 1930 1900 1830 1800 1730 1700 1600
Local time
-40 -50 -60 -65 -70 -75 -80 -85 -100
Longitude
-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60
Latitude
Pass No. 5427
31 Oct 63
2240 to 2328
Kp = 1_
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 152

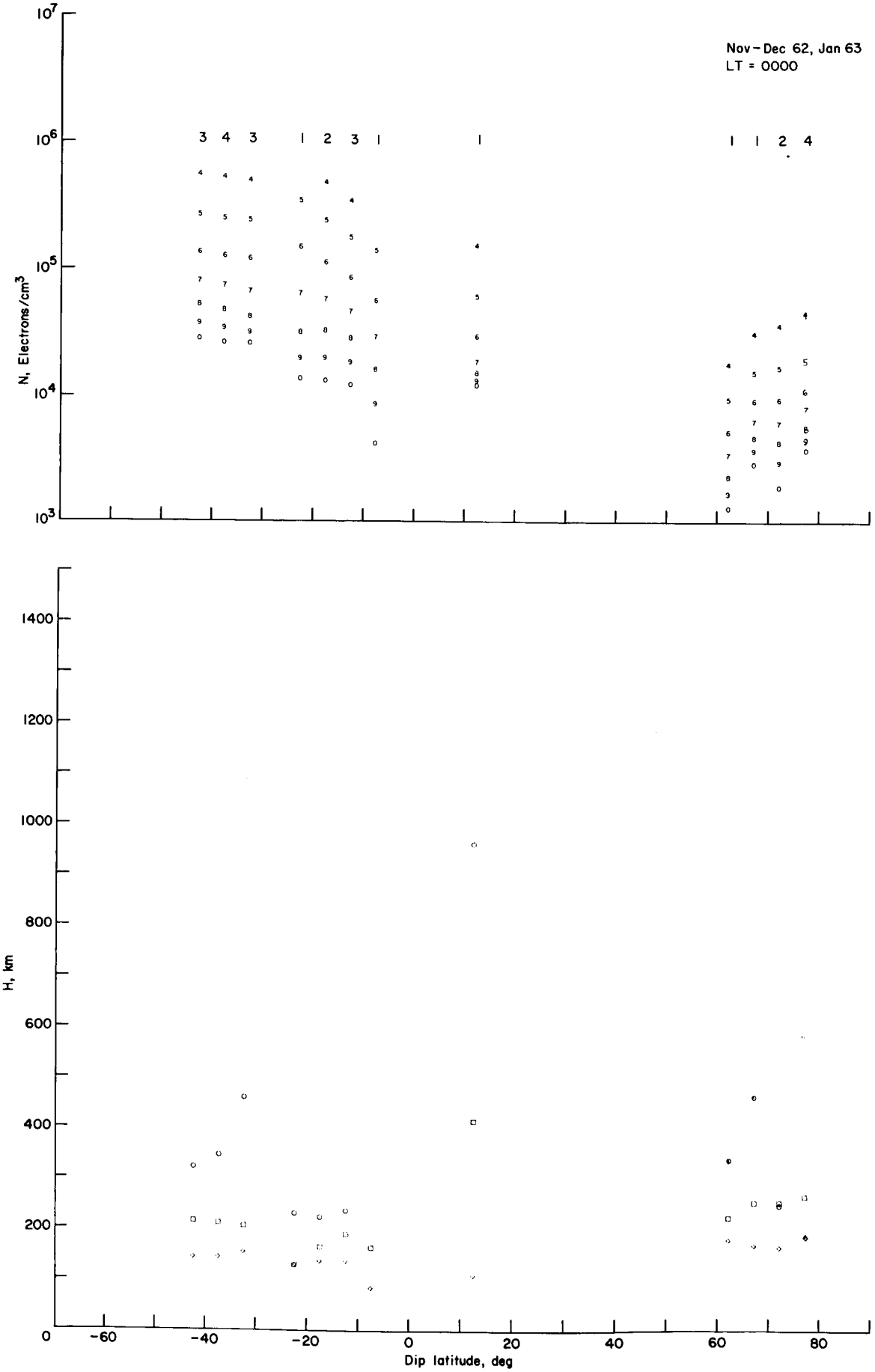


Figure 153

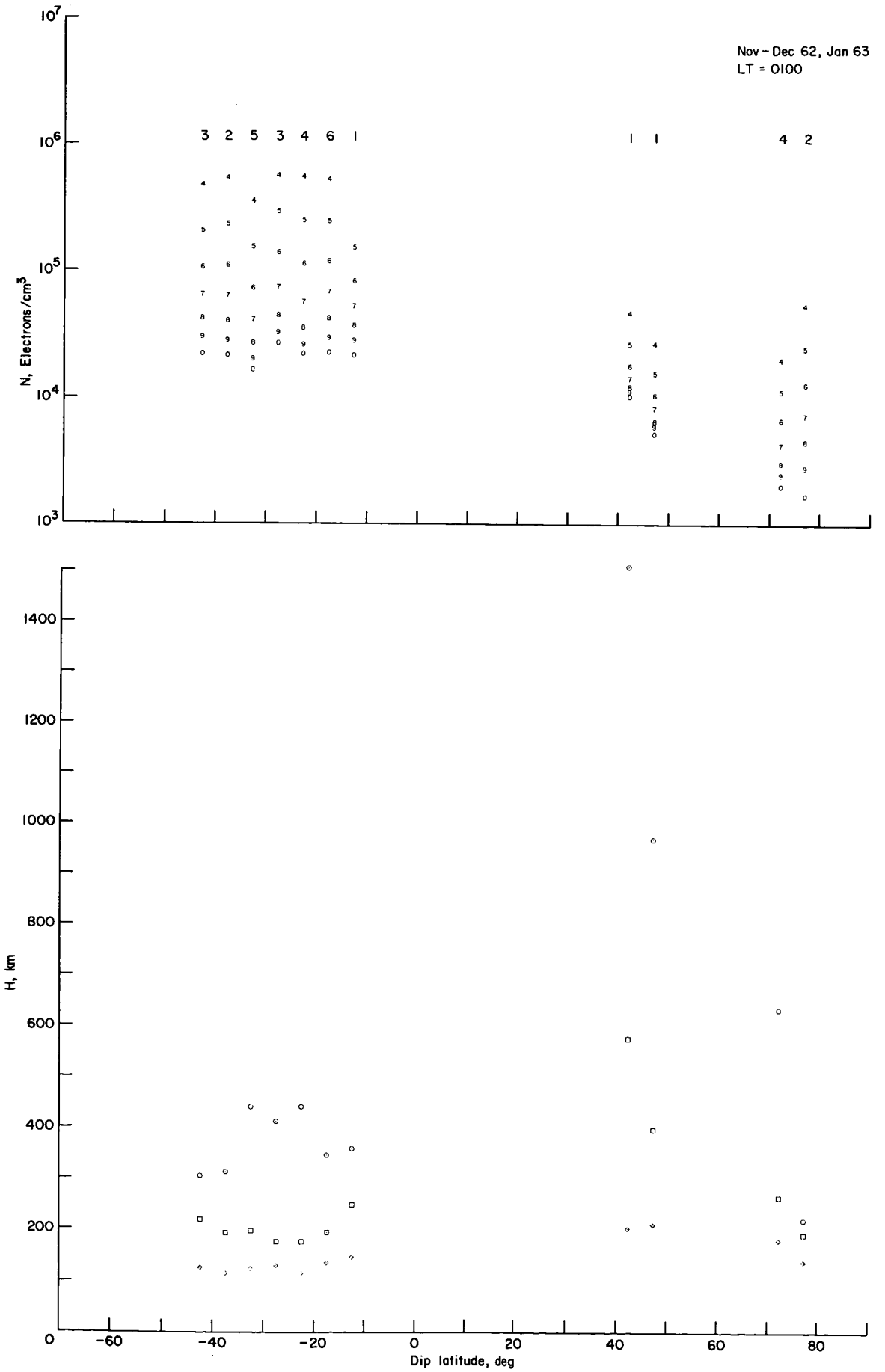


Figure 154

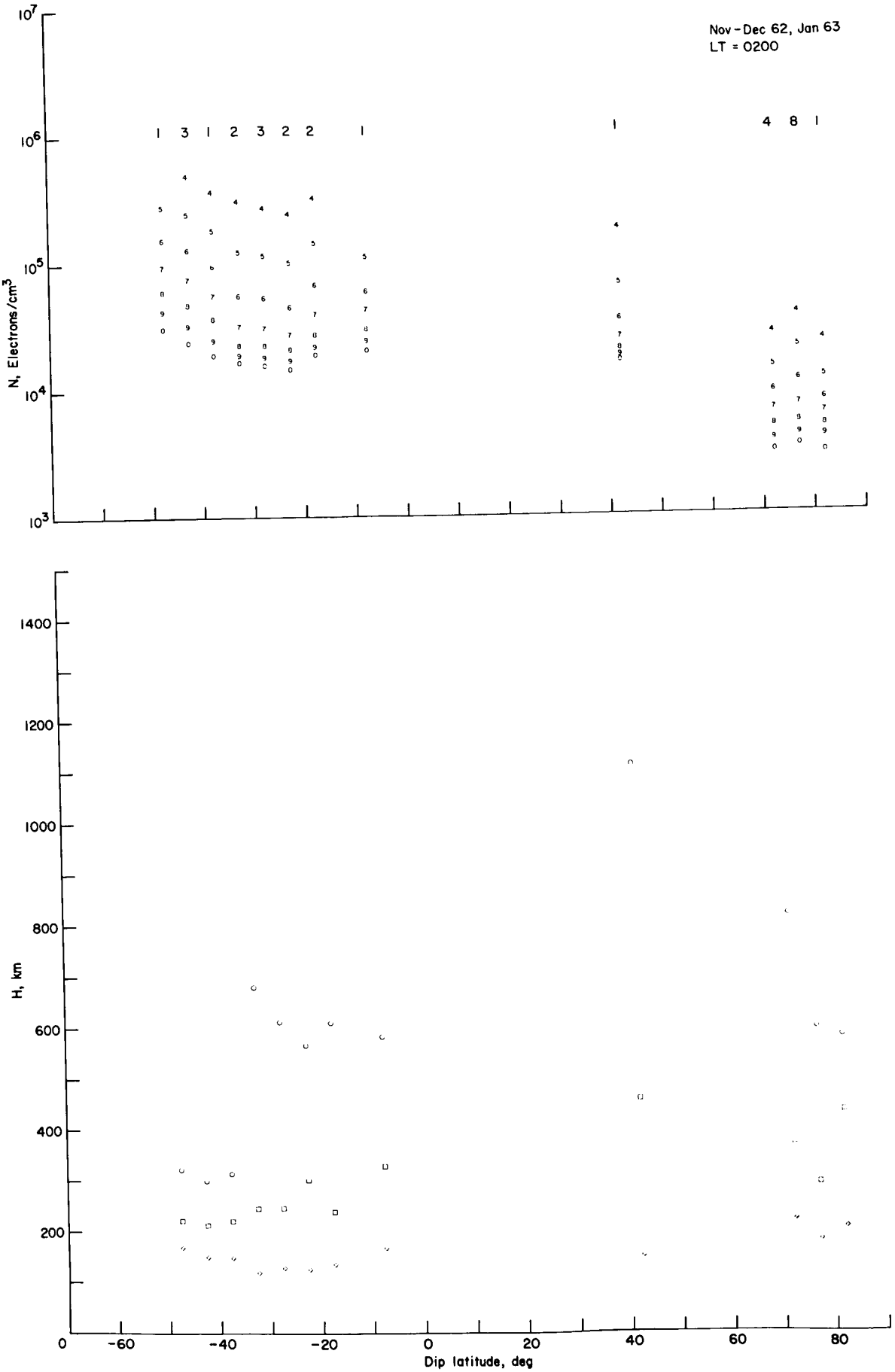


Figure 155

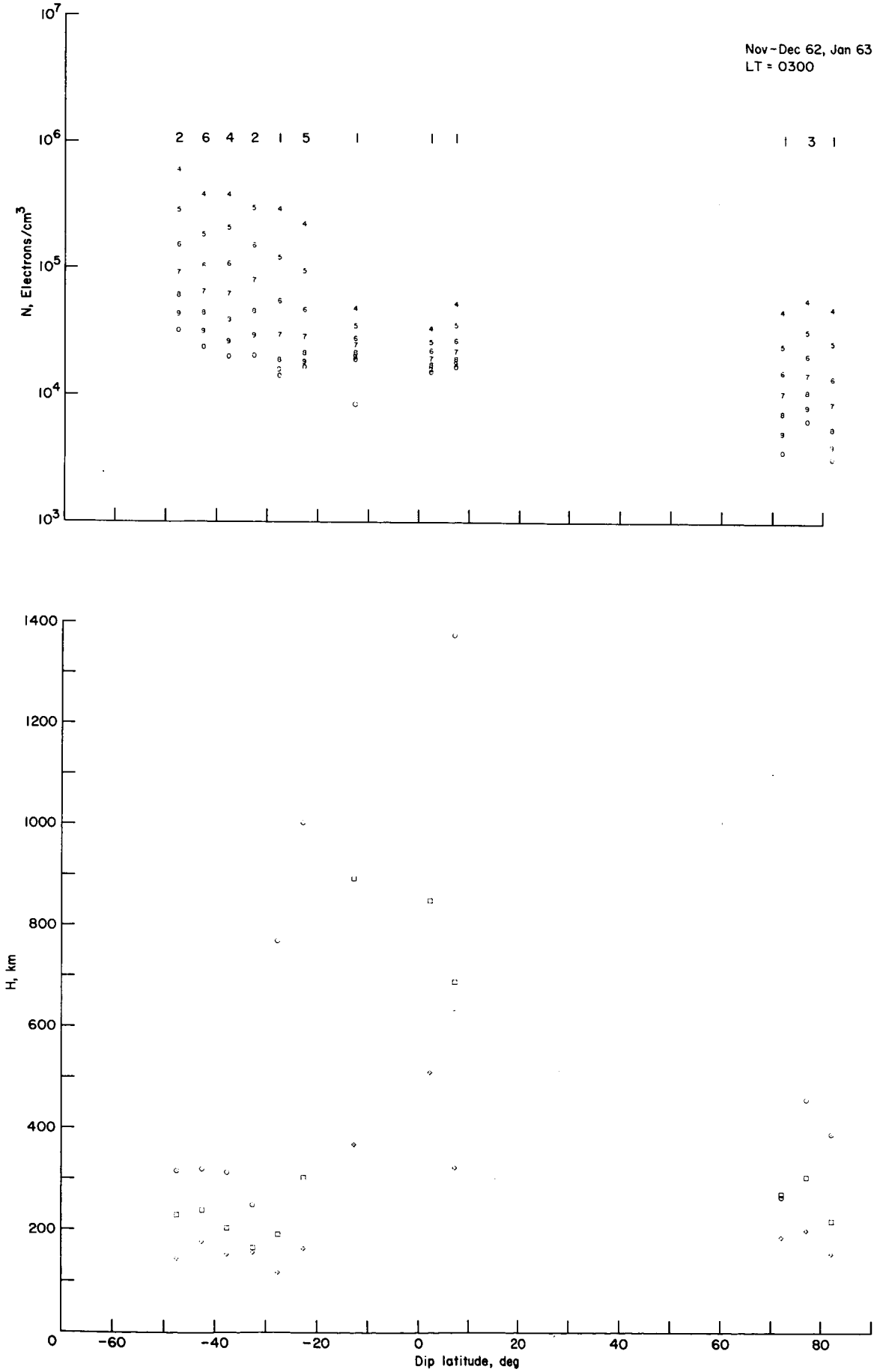


Figure 156

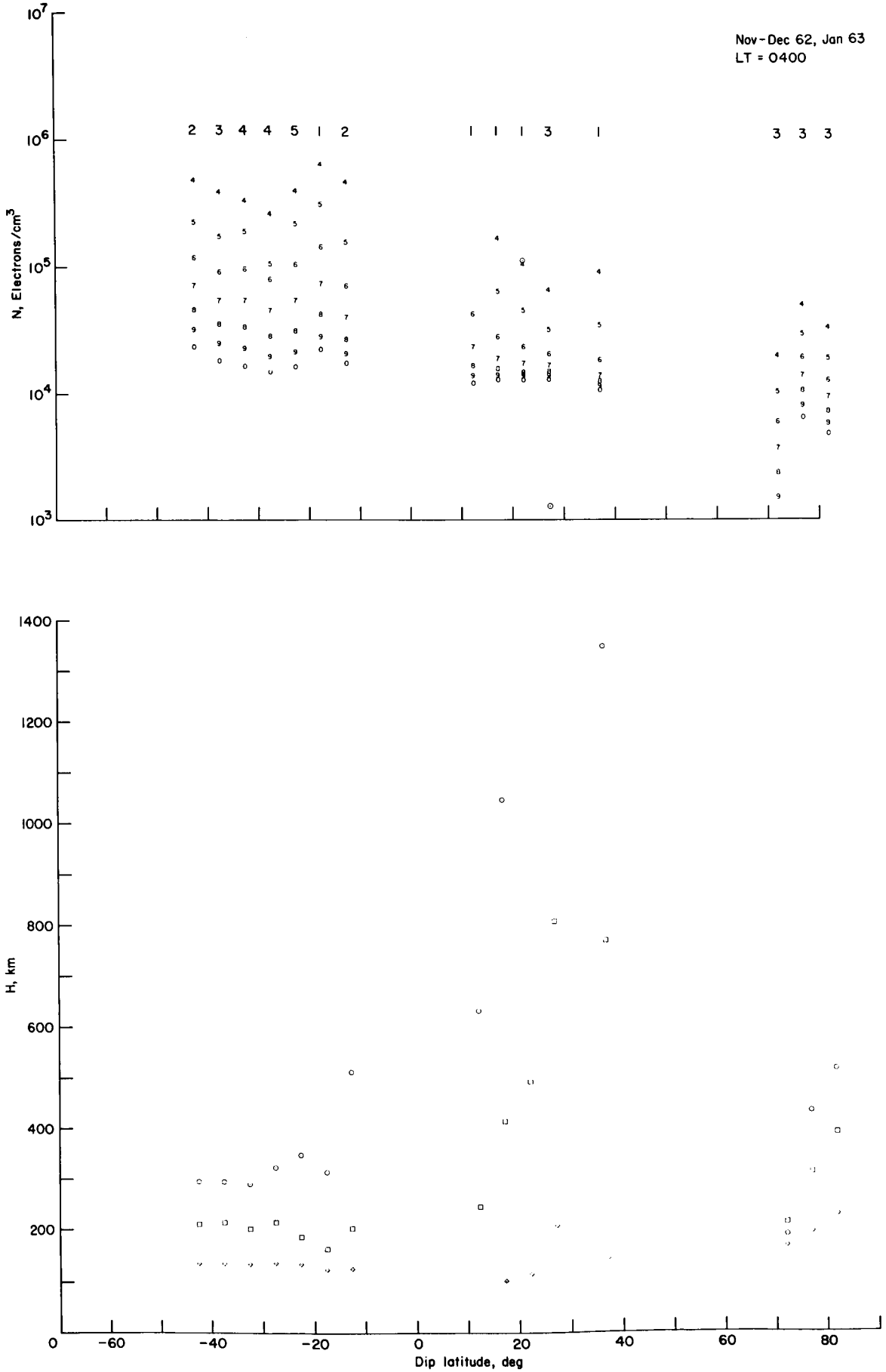

Nov-Dec 62, Jan 63
LT = 0400
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
2 3 4 4 5 1 2
1 1 1 3 1
3 3 3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 157

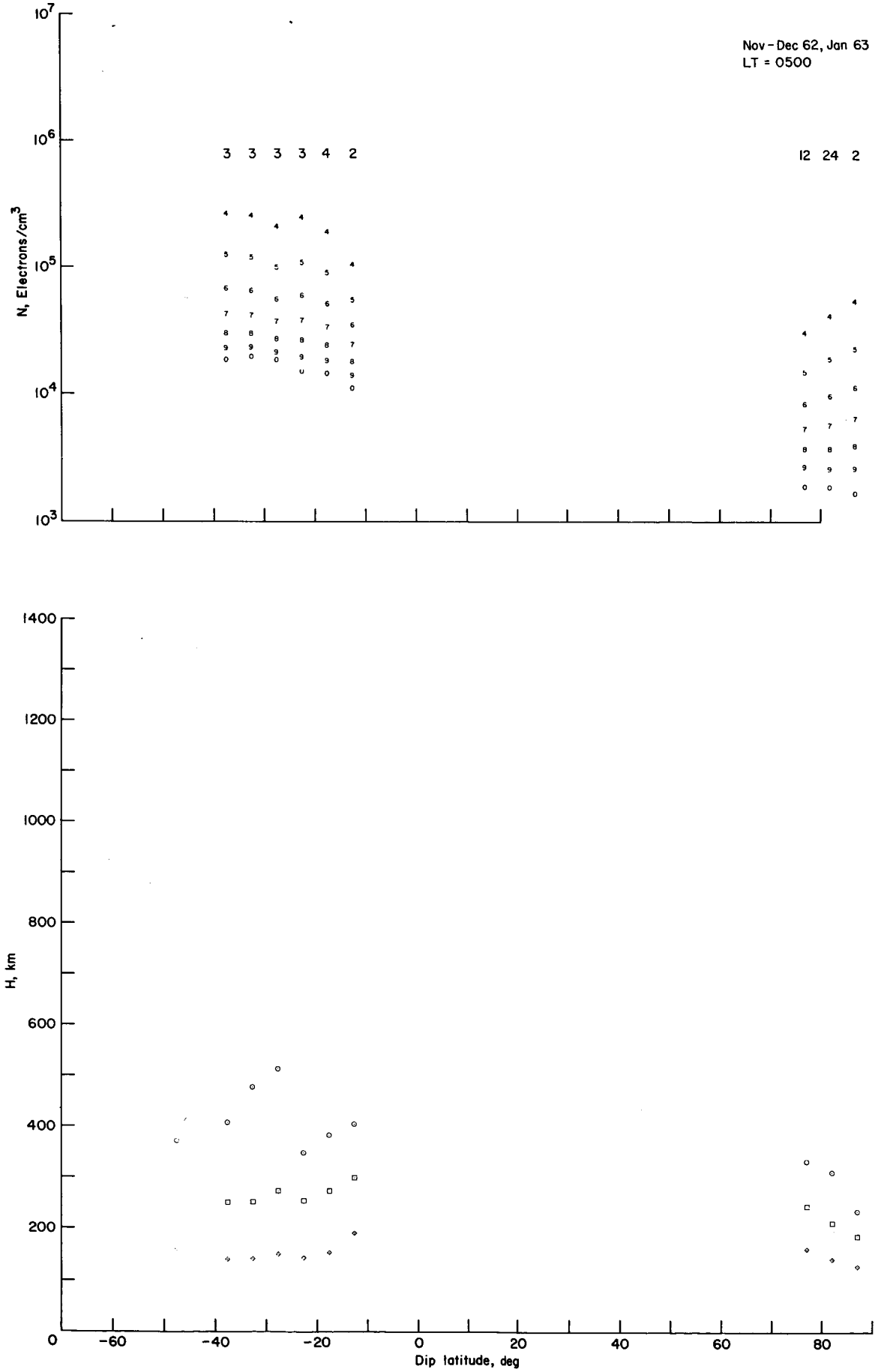


Figure 158

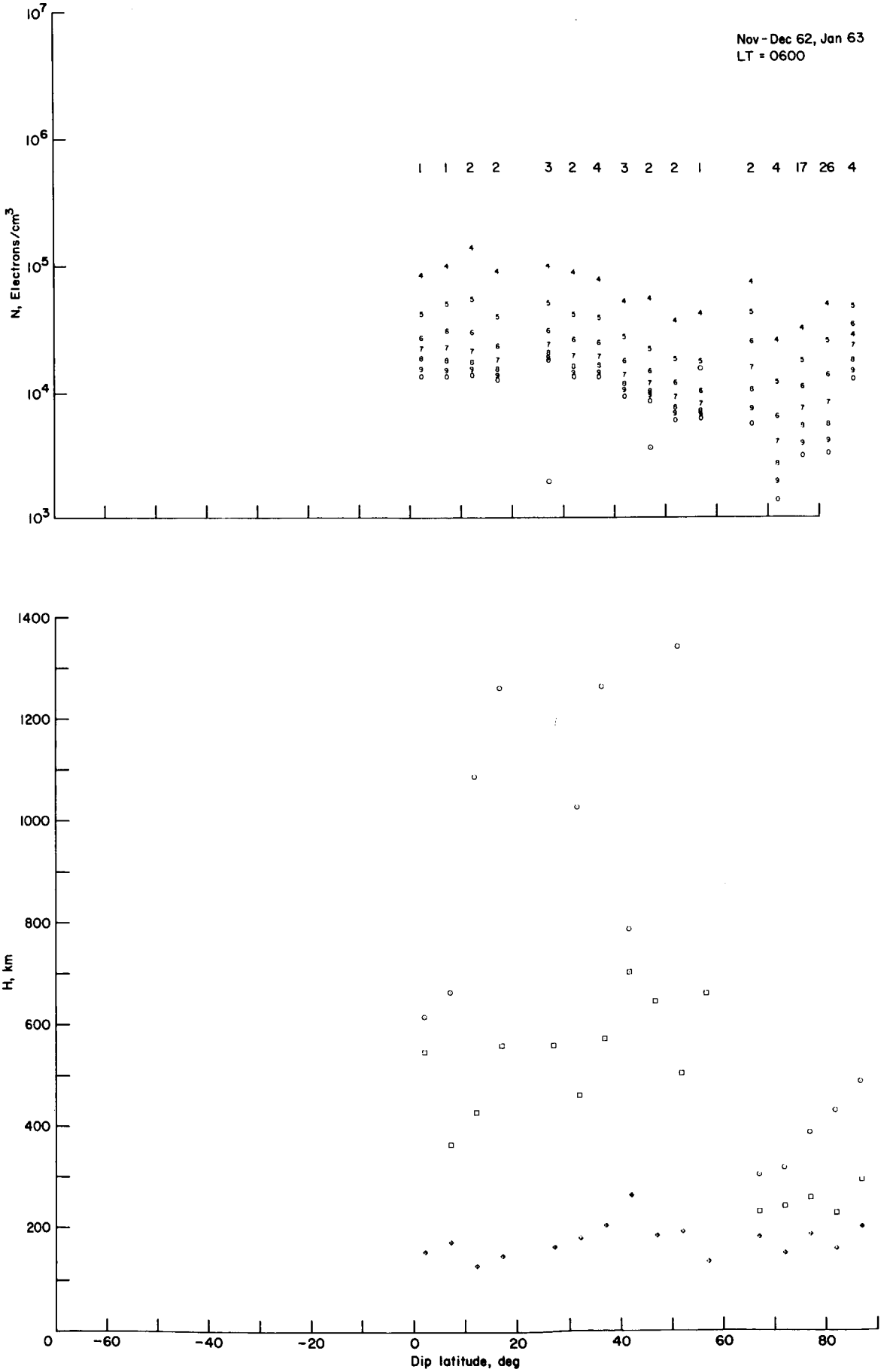
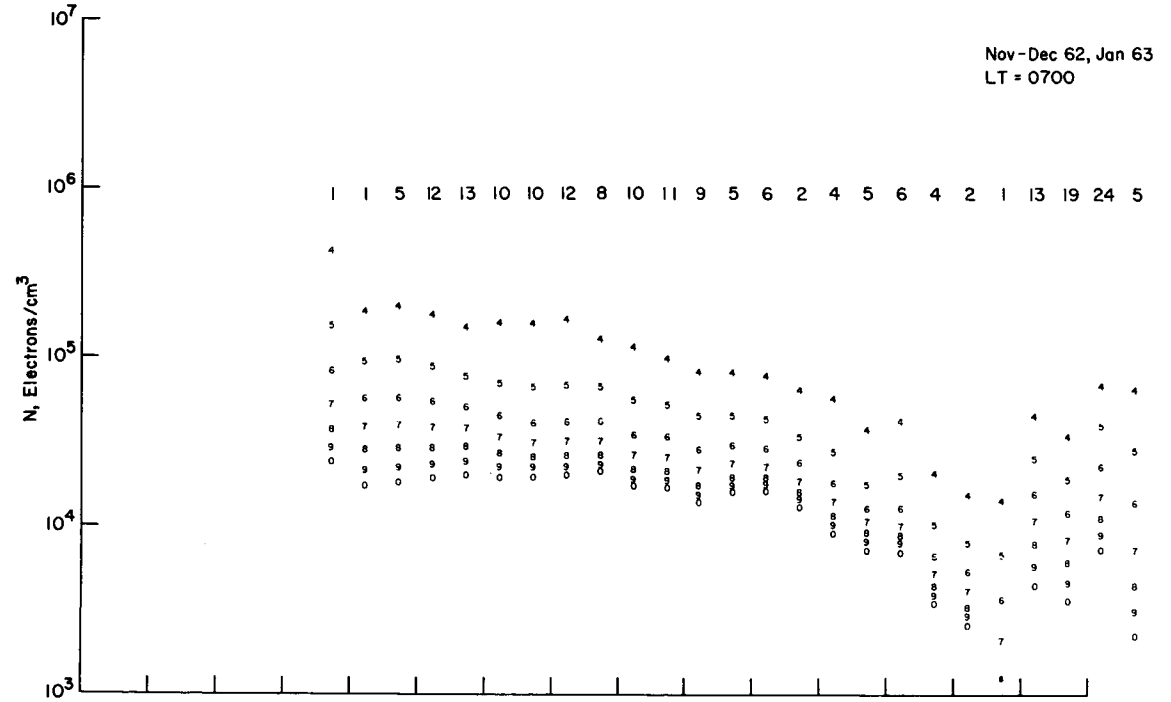


Figure 159


Nov-Dec 62, Jan 63
LT = 0700
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
1 1 5 12 13 10 10 12 8 10 11 9 5 6 2 4 5 6 4 2 1 13 19 24 5

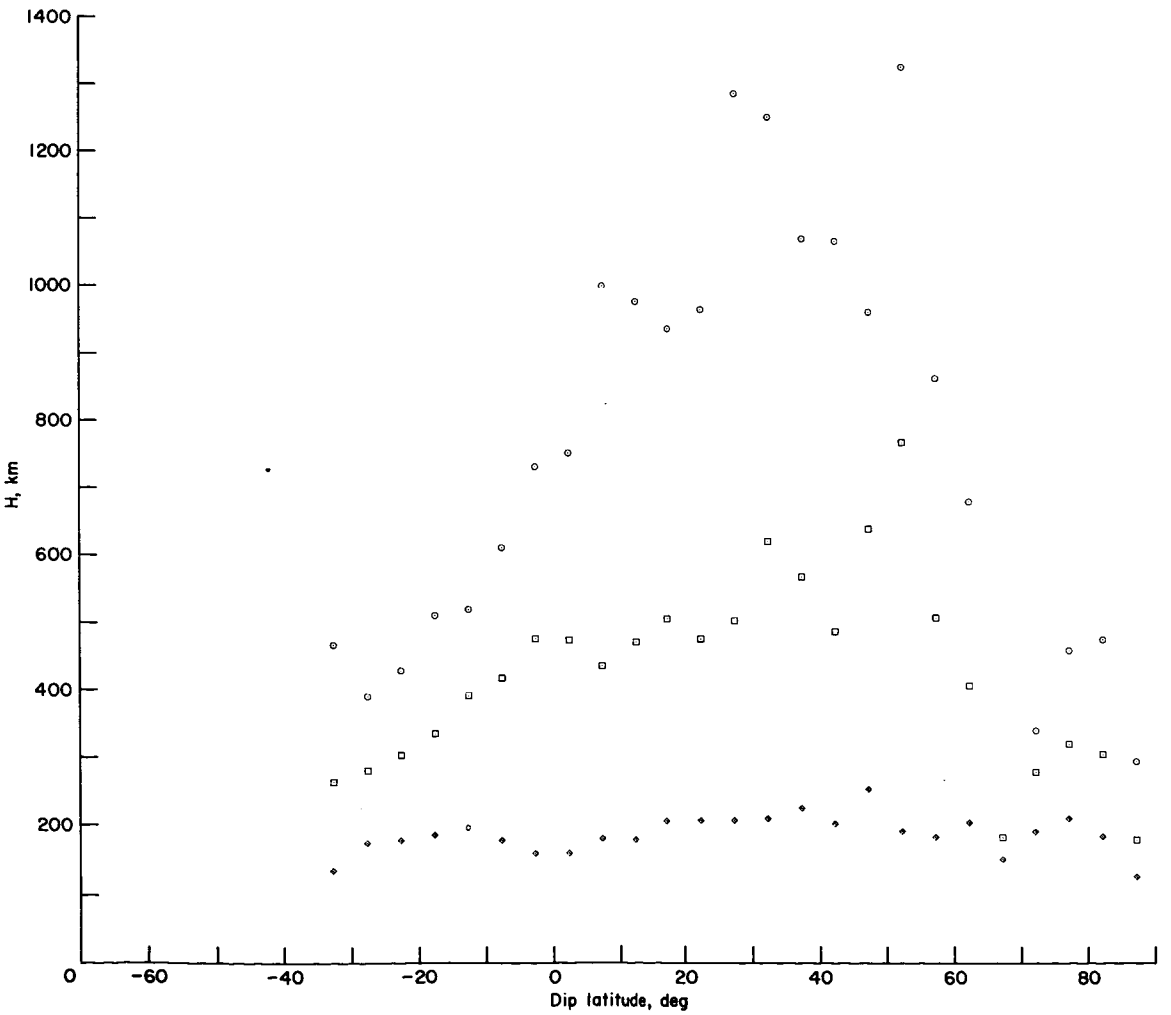

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 160

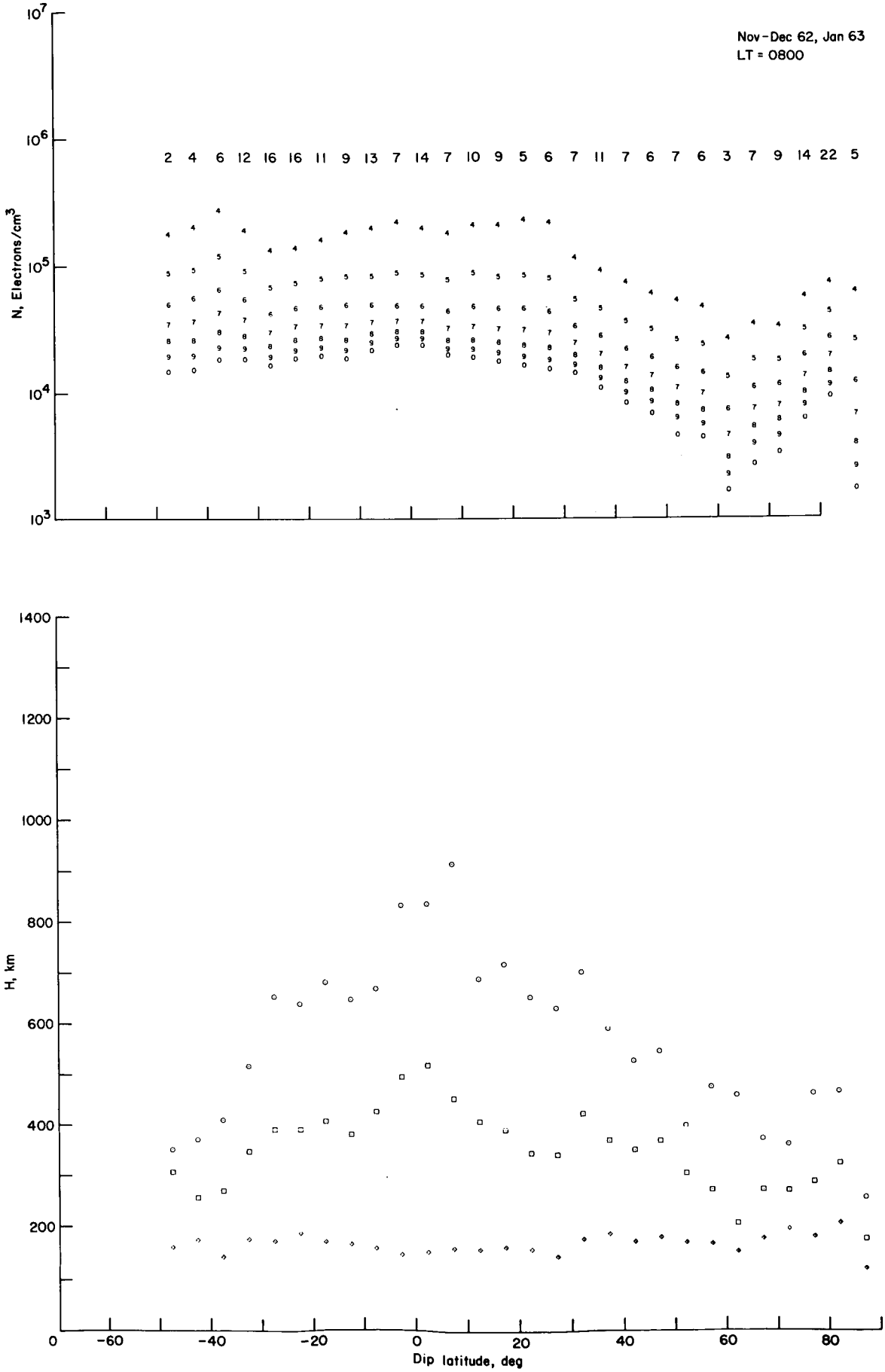
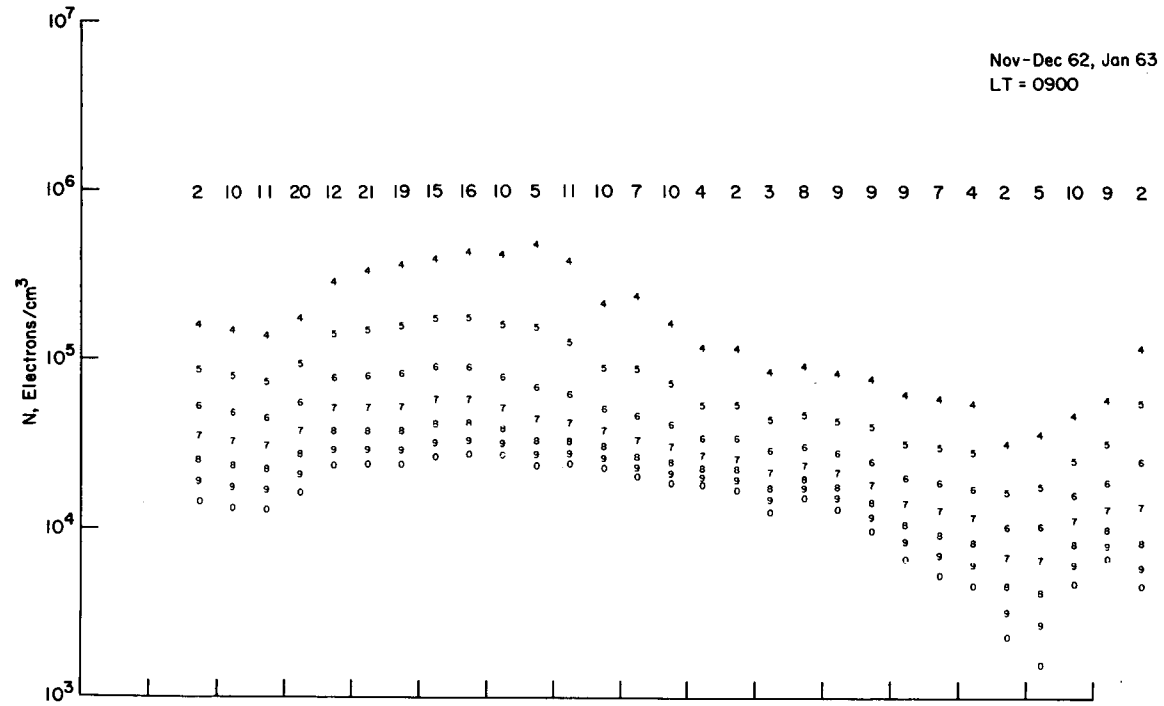


Figure 161


Nov-Dec 62, Jan 63
LT = 0900
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
2 10 11 20 12 21 19 15 16 10 5 11 10 7 10 4 2 3 8 9 9 9 7 4 2 5 10 9 2

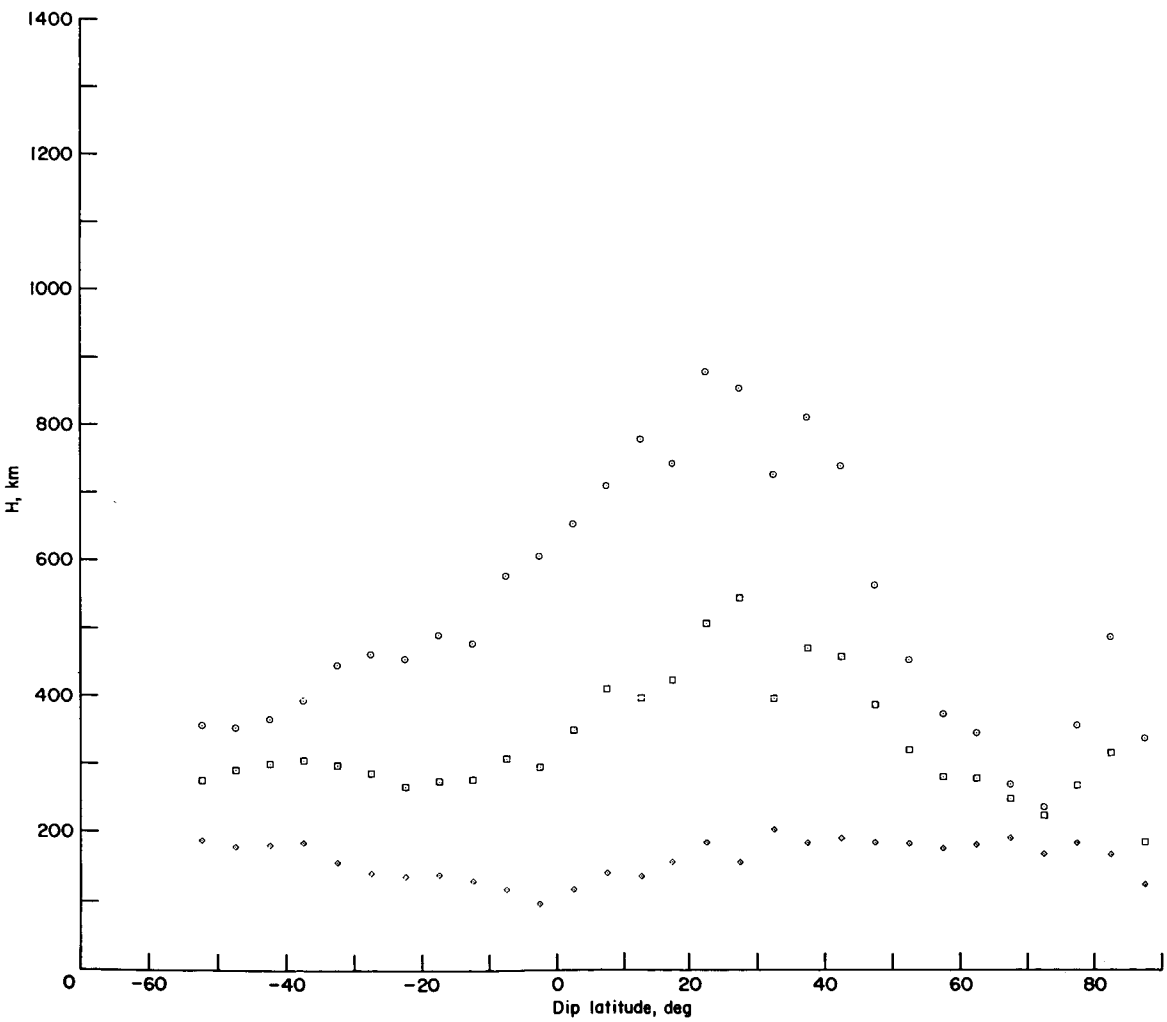
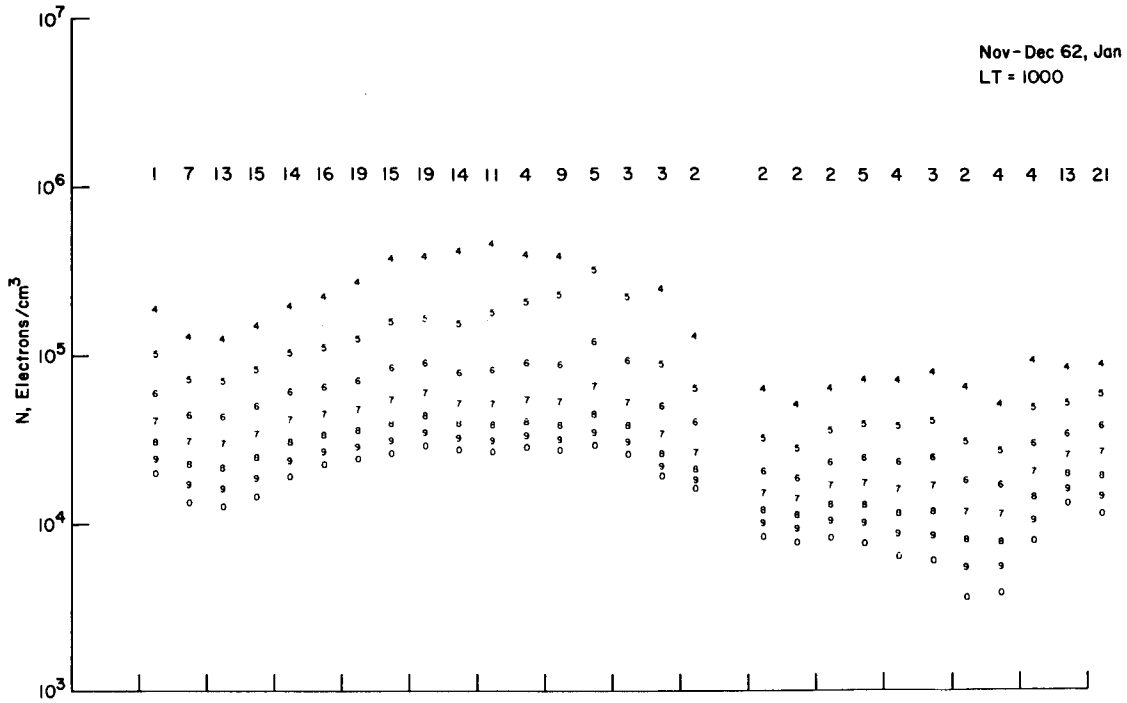

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 162


Nov-Dec 62, Jan 63
LT = 1000
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
1 7 13 15 14 16 19 15 19 14 11 4 9 5 3 3 2 2 2 2 5 4 3 2 4 4 13 21

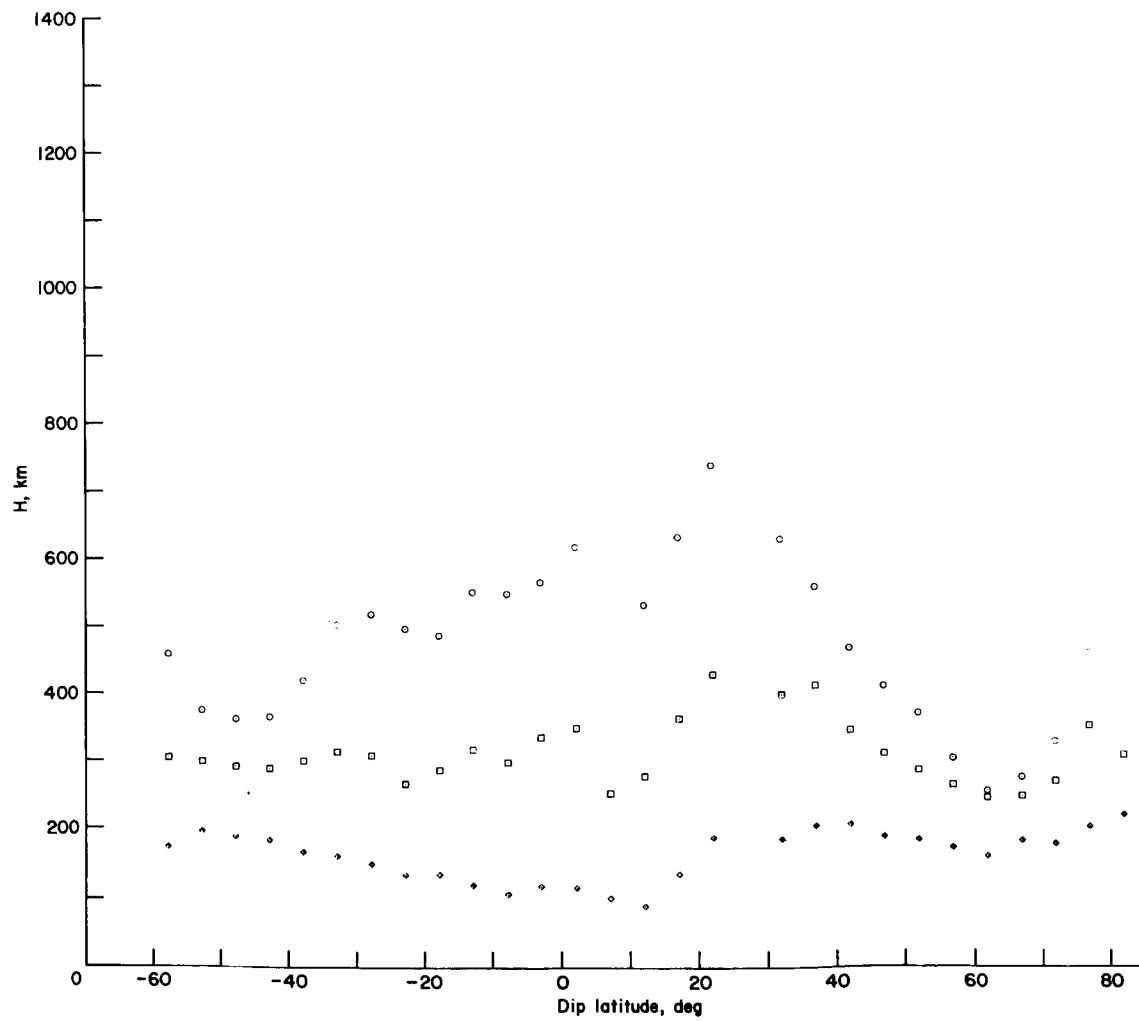

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 163

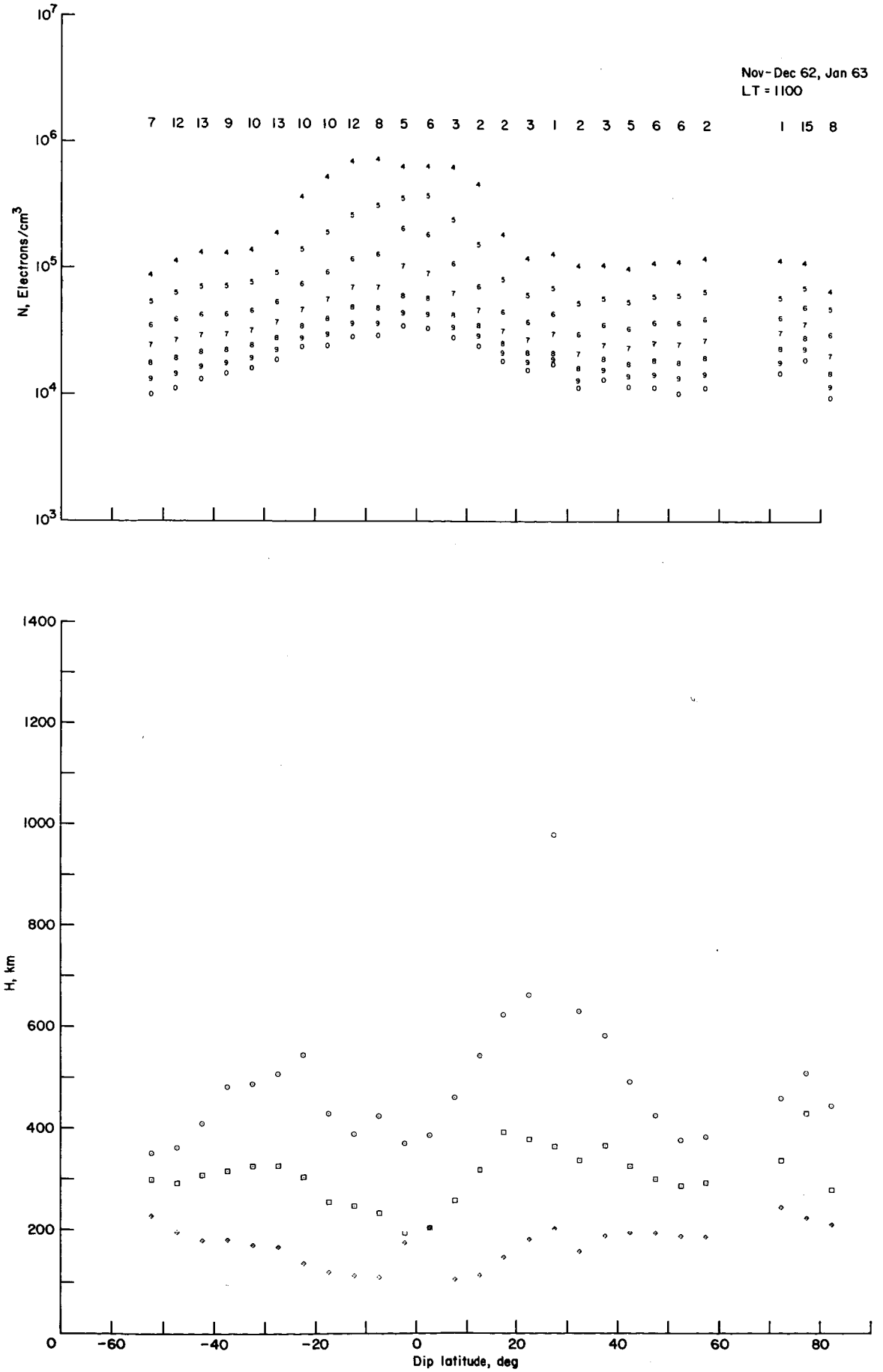

Nov-Dec 62, Jan 63
LT = 1100
7 12 13 9 10 13 10 10 12 8 5 6 3 2 2 3 1 2 3 5 6 6 2 1 15 8
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60 -40 -20 0 20 40 60 80
Dip latitude, deg

Figure 164

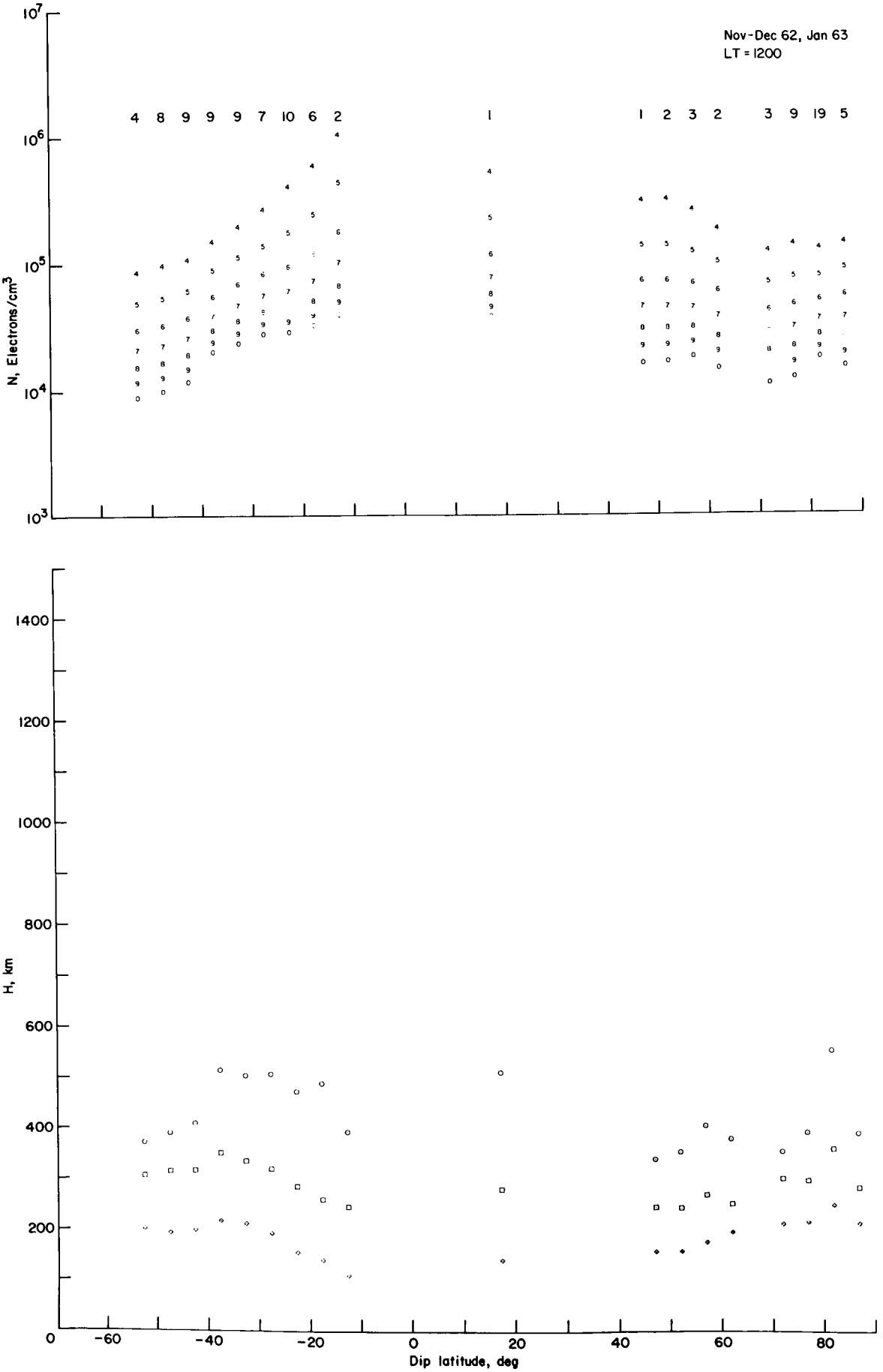

Nov-Dec 62, Jan 63
LT = 1200
4 8 9 9 9 7 10 6 2
1
1 2 3 2
3 9 19 5
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 165

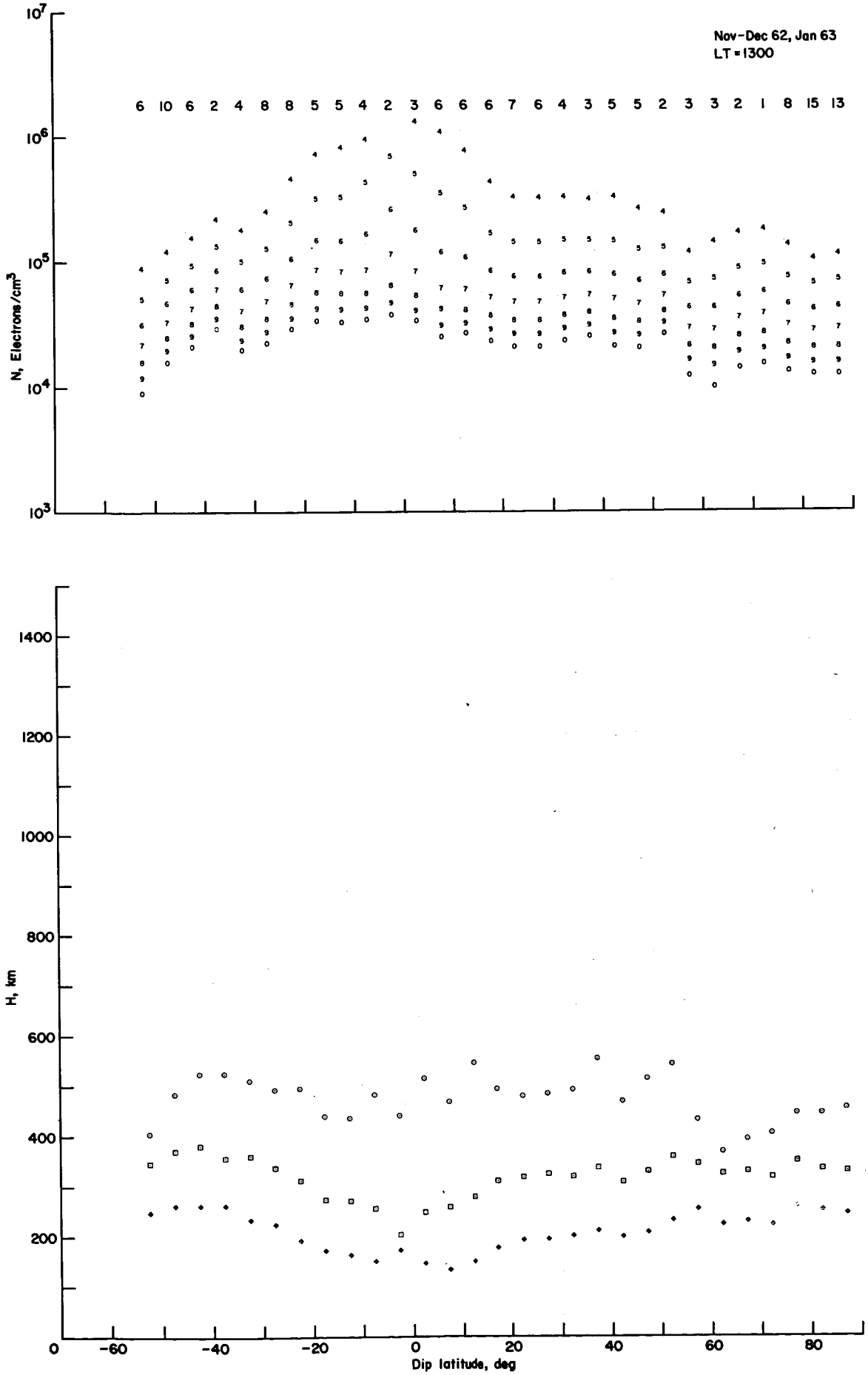

Nov-Dec 62, Jan 63
LT = 1300
6 10 6 2 4 8 8 5 5 4 2 3 6 6 6 7 6 4 3 5 5 2 3 3 2 1 8 15 13
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 166

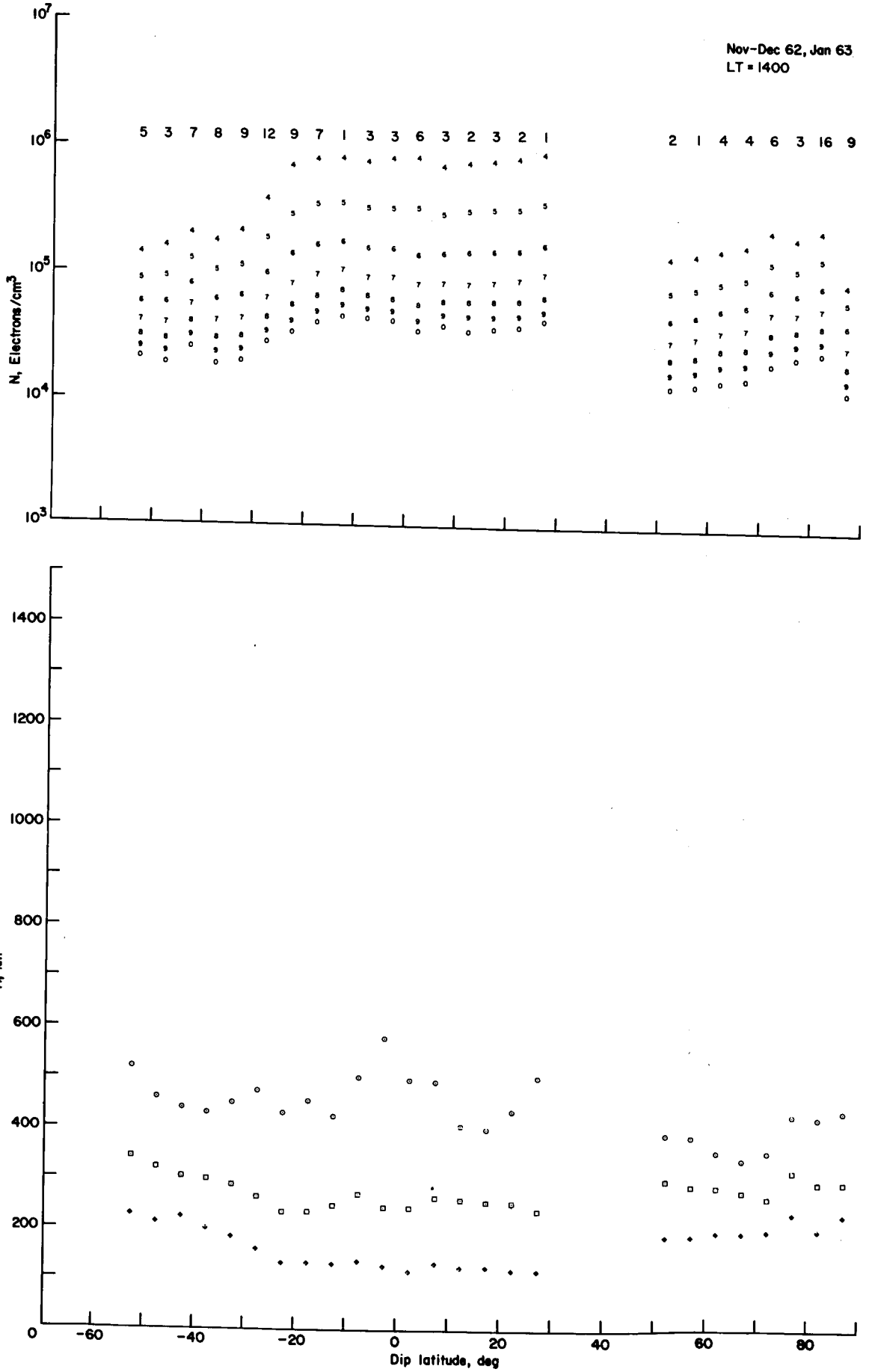
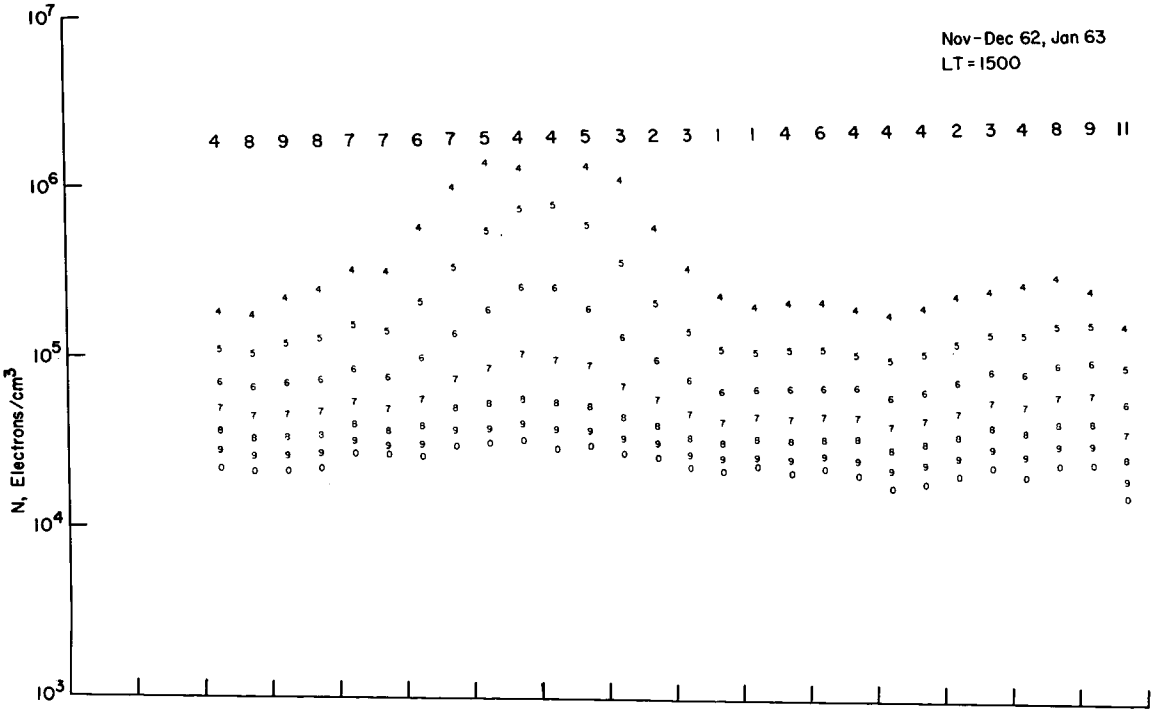

Nov-Dec 62, Jan 63
LT = 1400
5 3 7 8 9 12 9 7 1 3 3 6 3 2 3 2 1
2 1 4 4 6 3 16 9
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 167


Nov-Dec 62, Jan 63
LT = 1500
4 8 9 8 7 7 6 7 5 4 4 5 3 2 3 1 1 4 6 4 4 4 2 3 4 8 9 11
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³

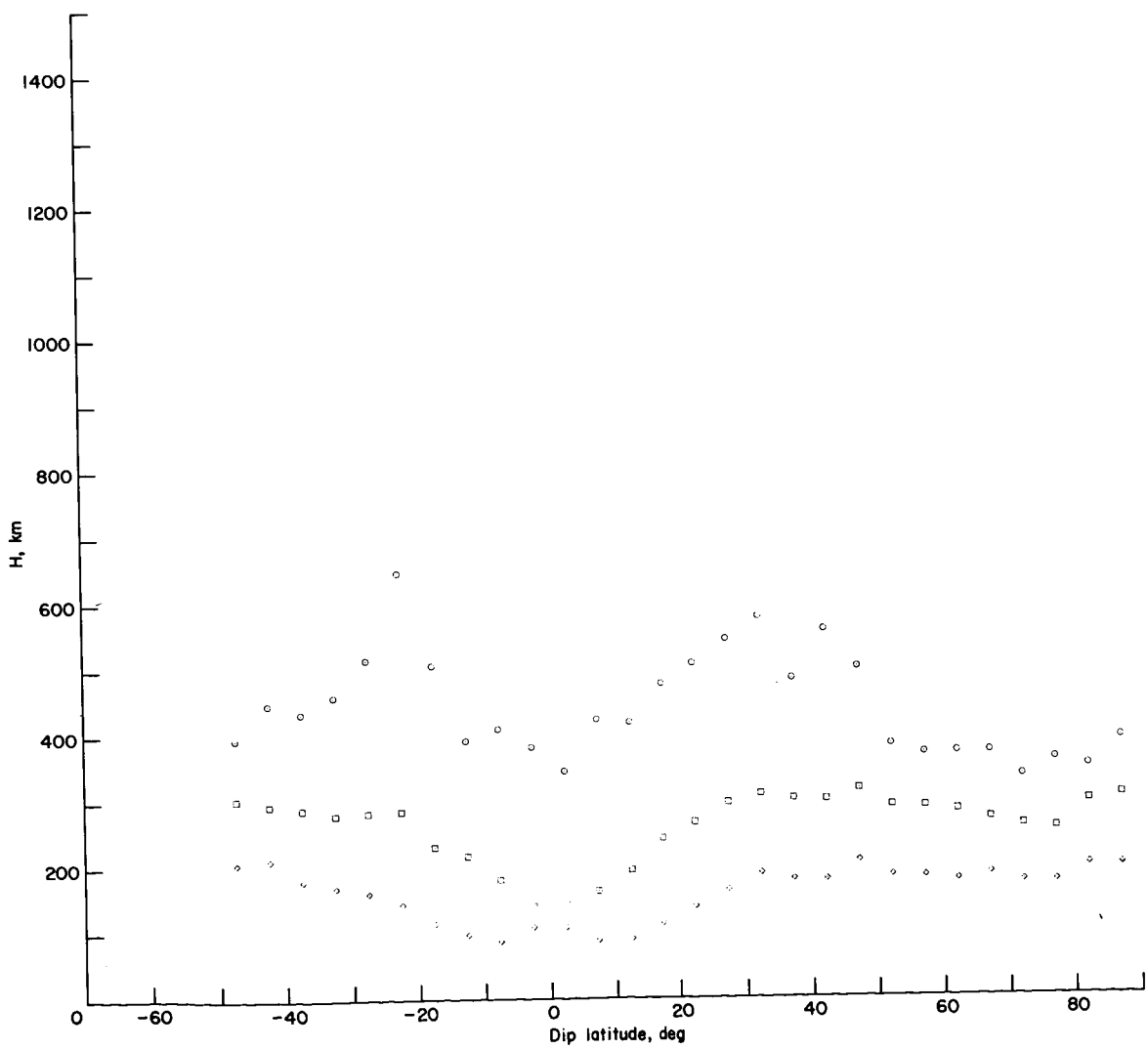

H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 168

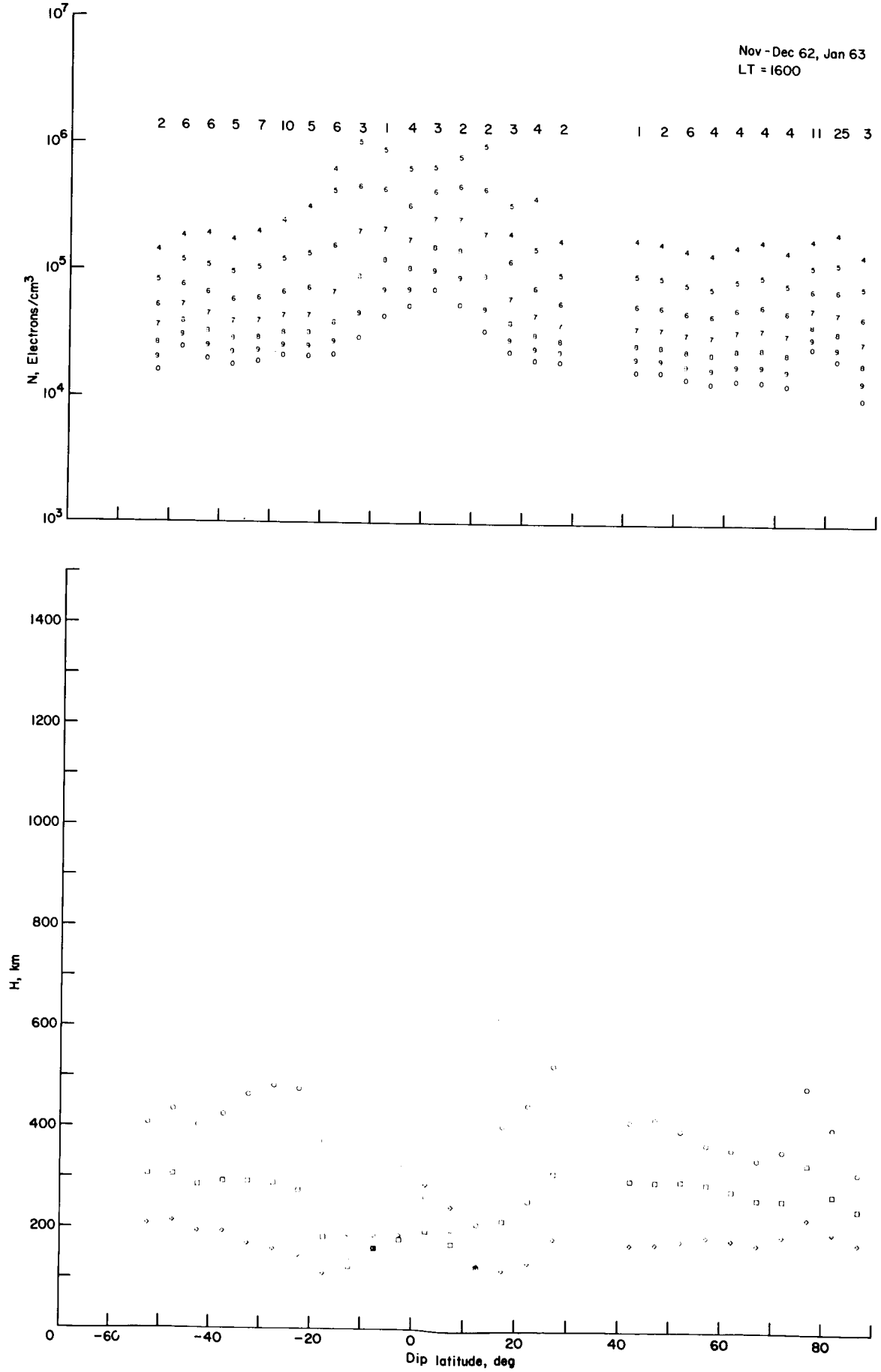

Nov - Dec 62, Jan 63
LT = 1600
2 6 6 5 7 10 5 6 3 1 4 3 2 2 3 4 2
1 2 6 4 4 4 4 11 25 3
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 169

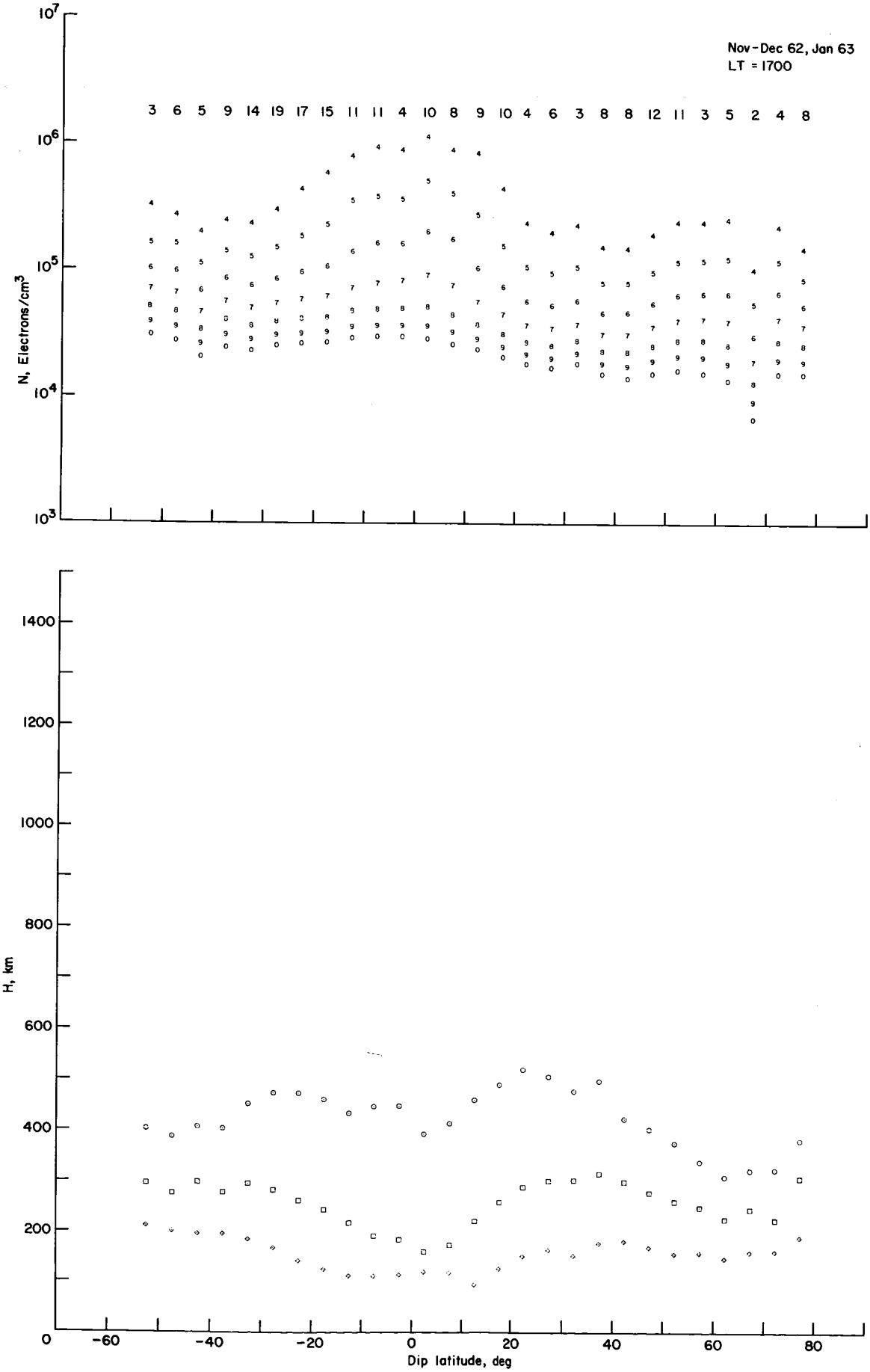

Nov-Dec 62, Jan 63
LT = 1700
3 6 5 9 14 19 17 15 11 11 4 10 8 9 10 4 6 3 8 8 12 11 3 5 2 4 8
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 170

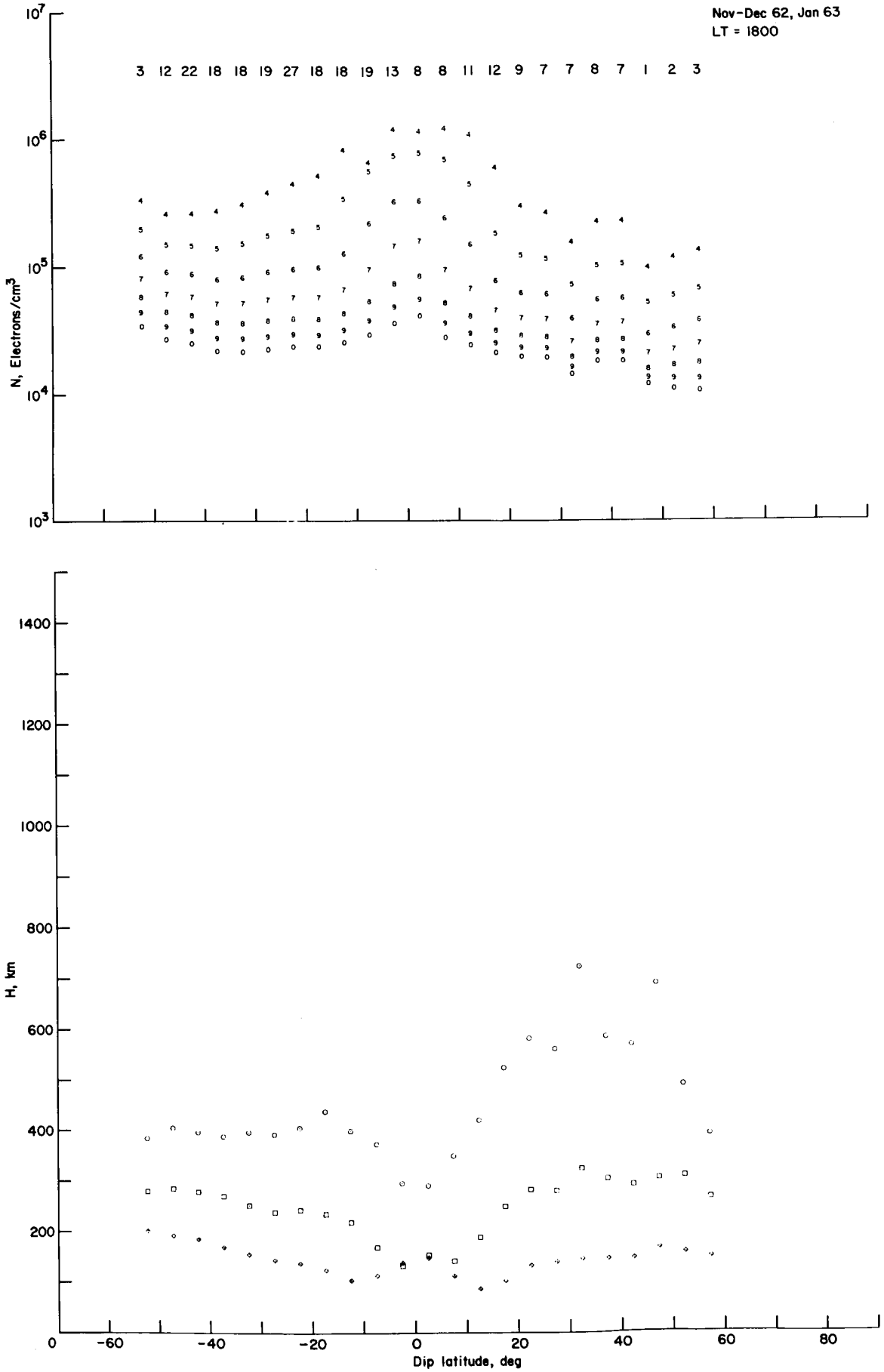

Nov-Dec 62, Jan 63
LT = 1800
3 12 22 18 18 19 27 18 18 19 13 8 8 11 12 9 7 7 8 7 1 2 3
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 171

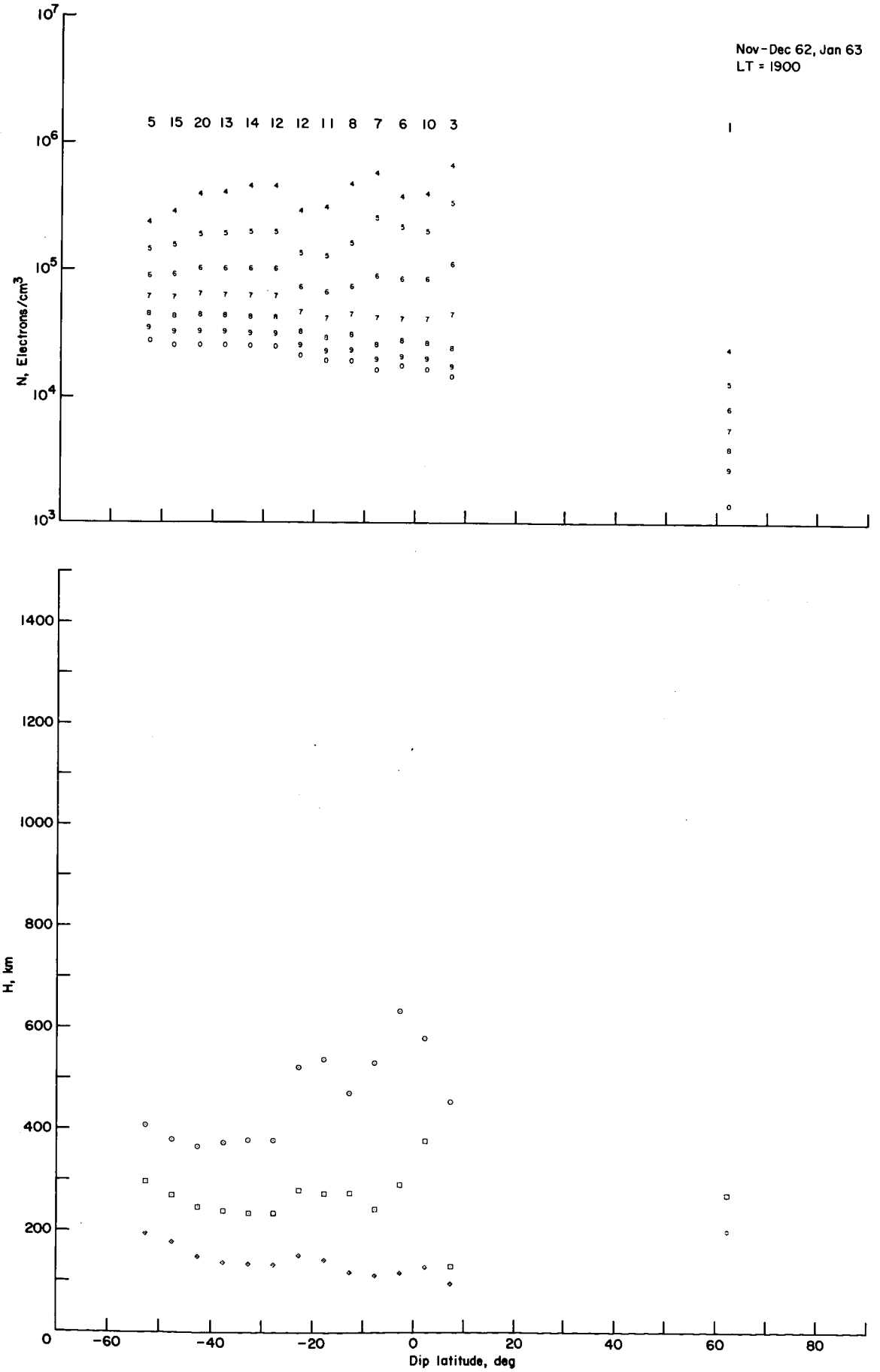

Nov-Dec 62, Jan 63
LT = 1900
5 15 20 13 14 12 12 11 8 7 6 10 3
1
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 172

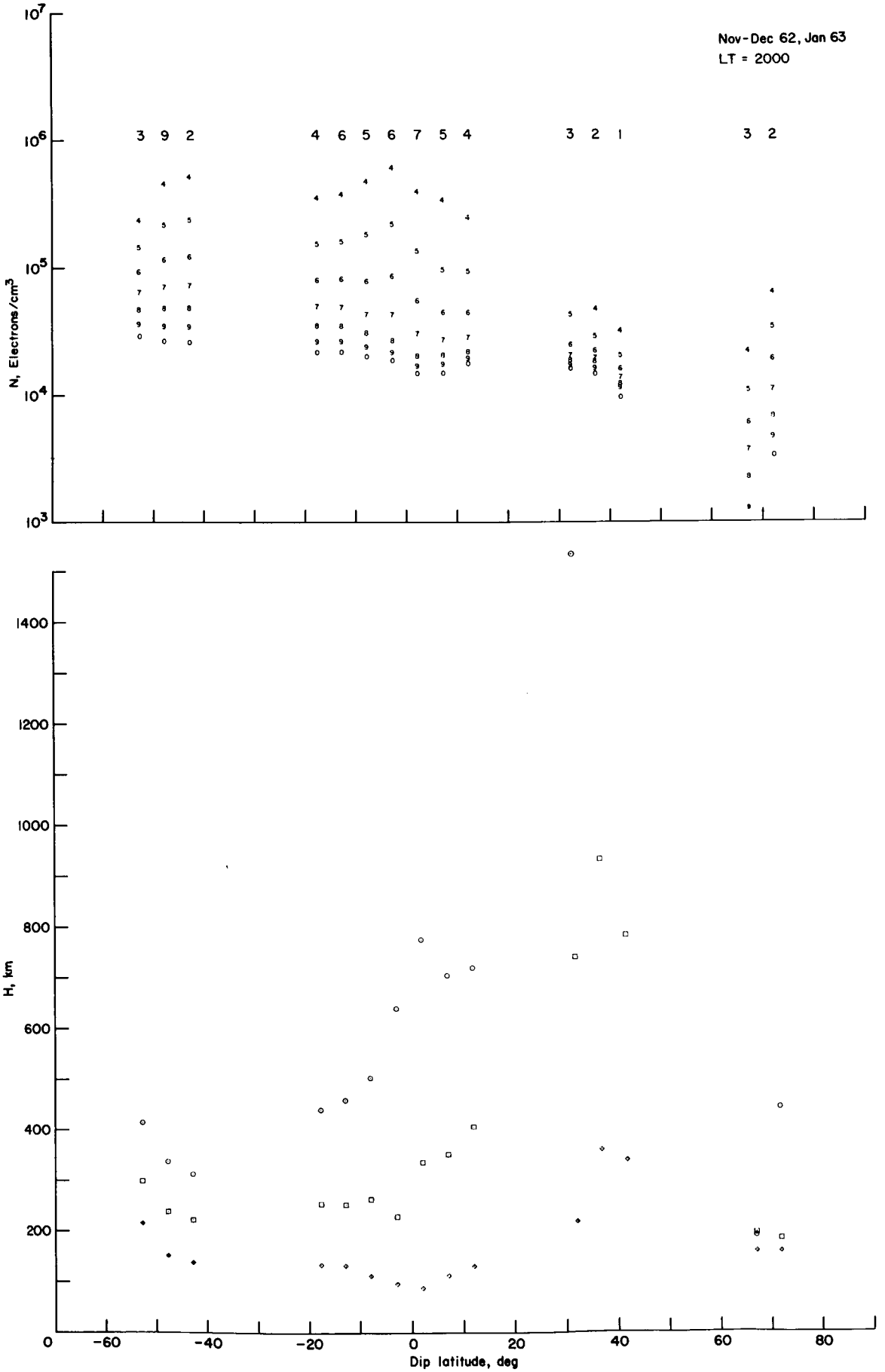


Figure 173

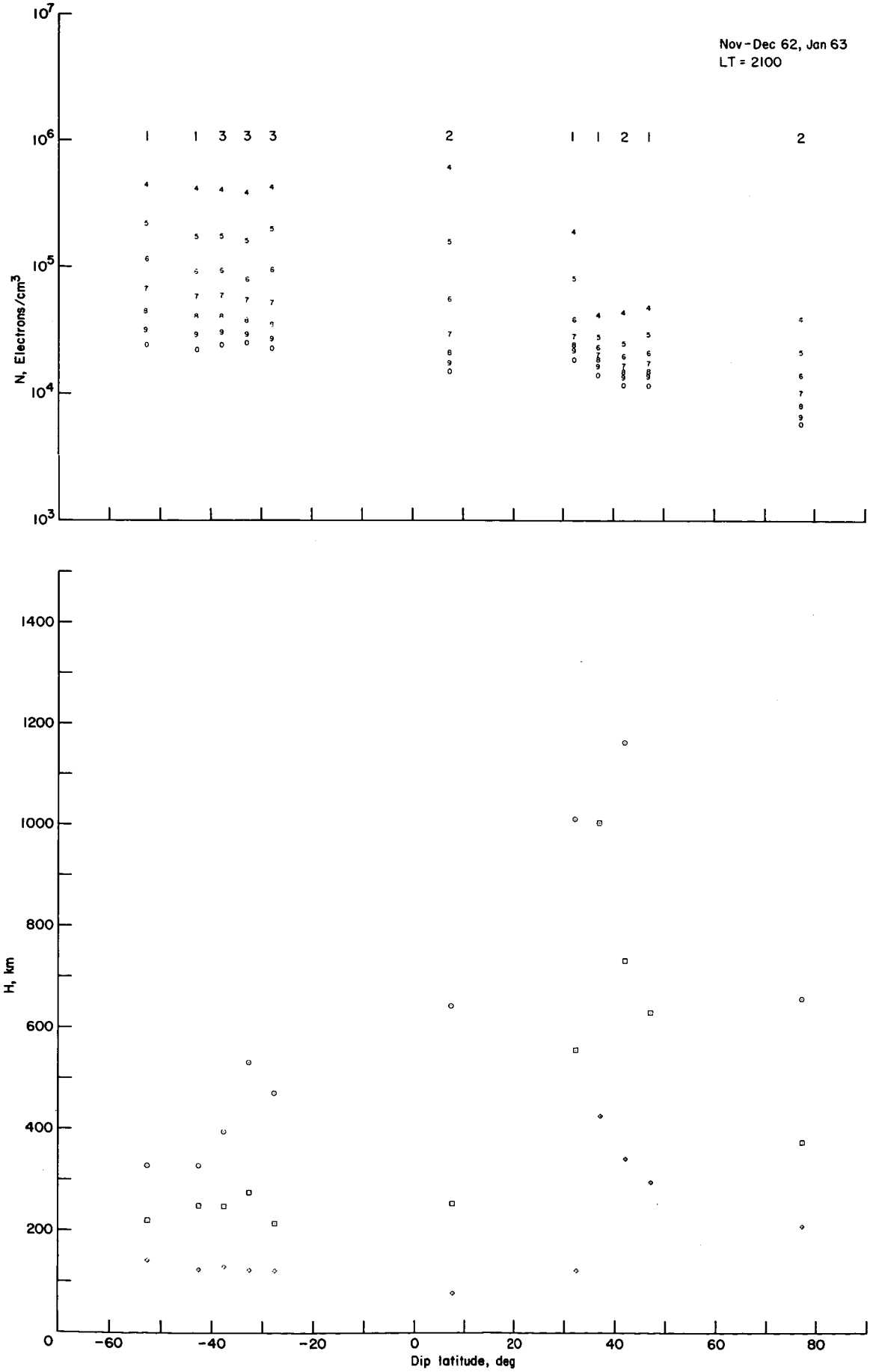


Figure 174

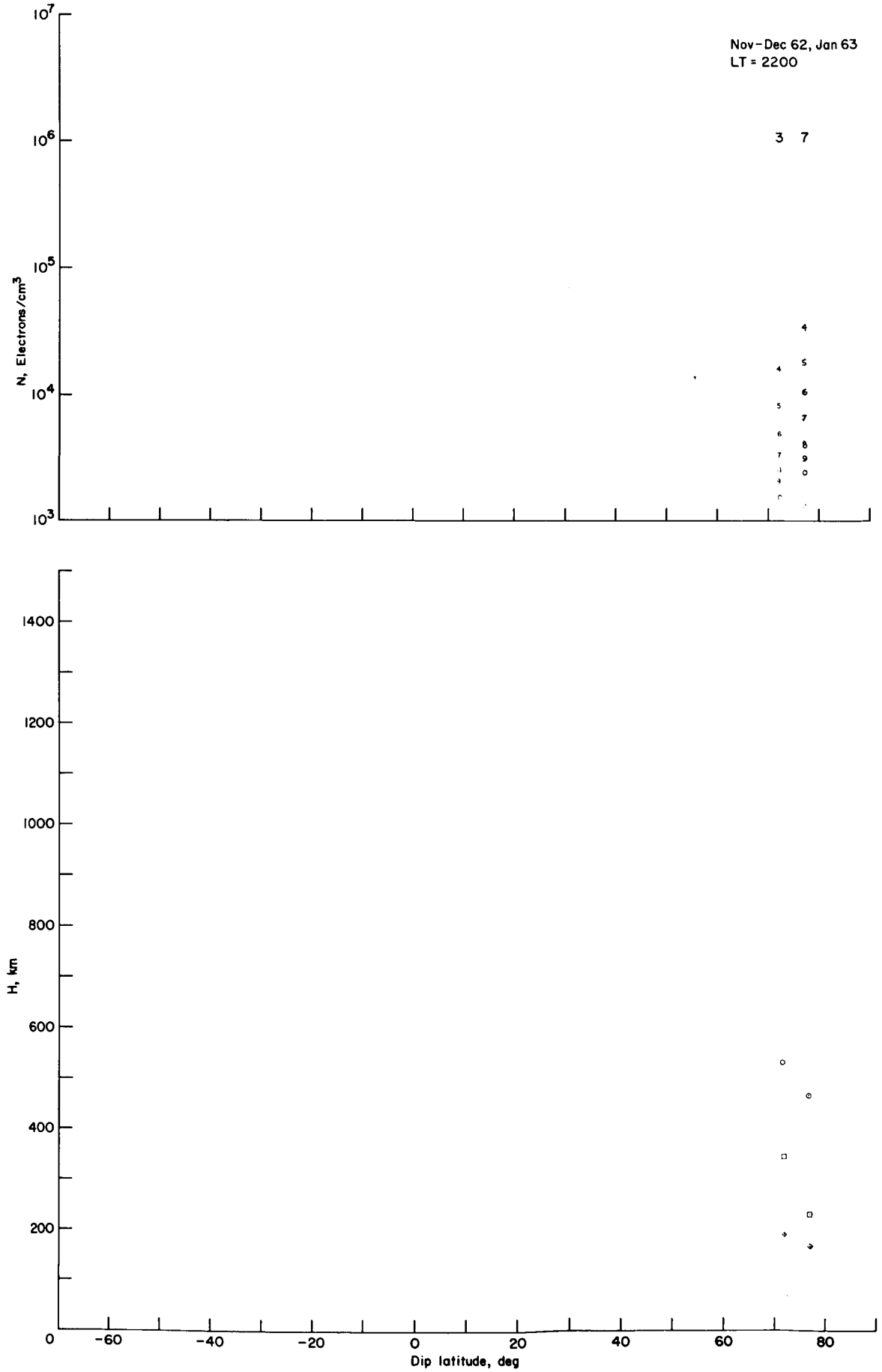


Figure 175

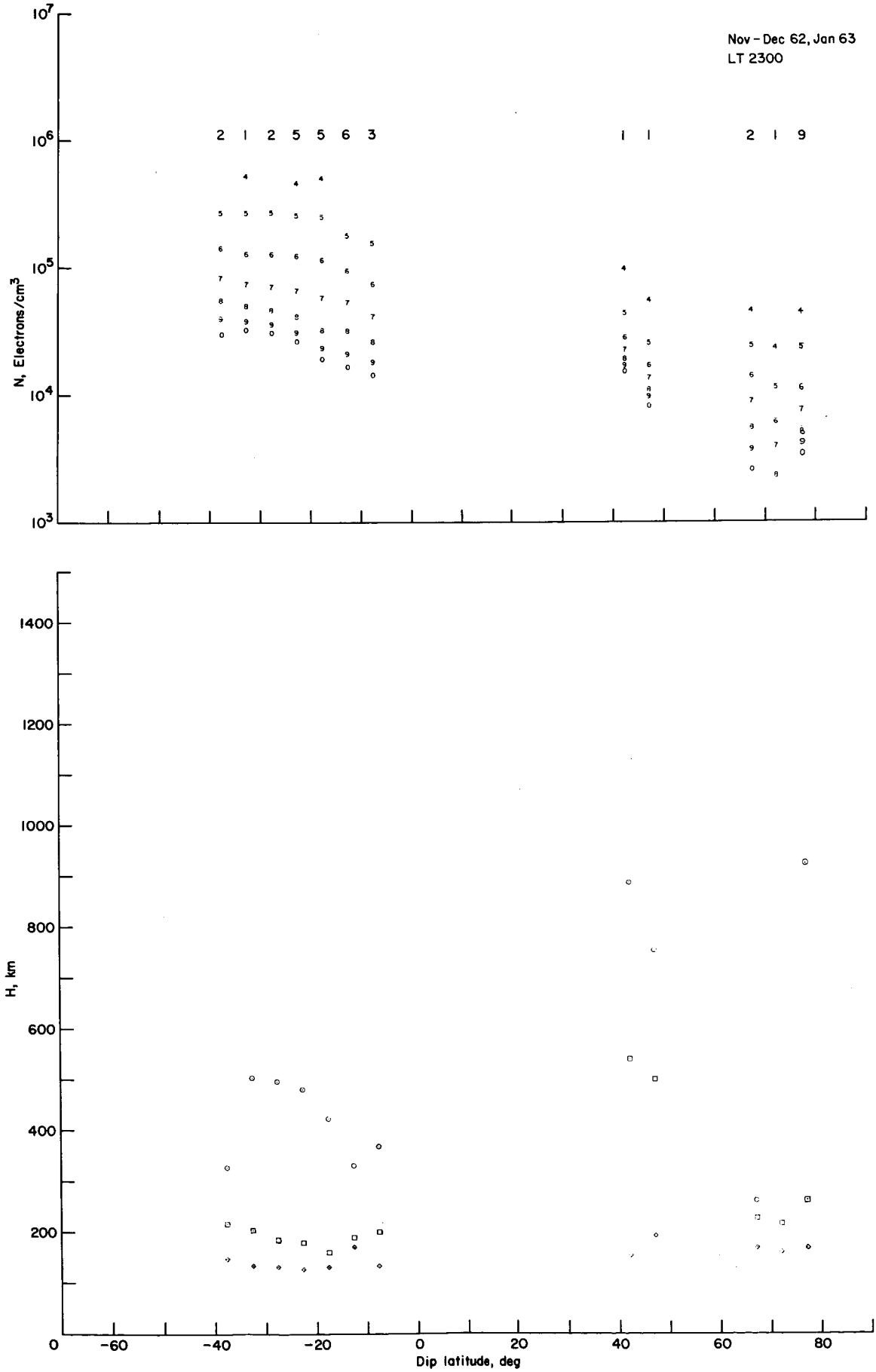

Nov - Dec 62, Jan 63
LT 2300
2 1 2 5 5 6 3
1 1
2 1 9
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 176

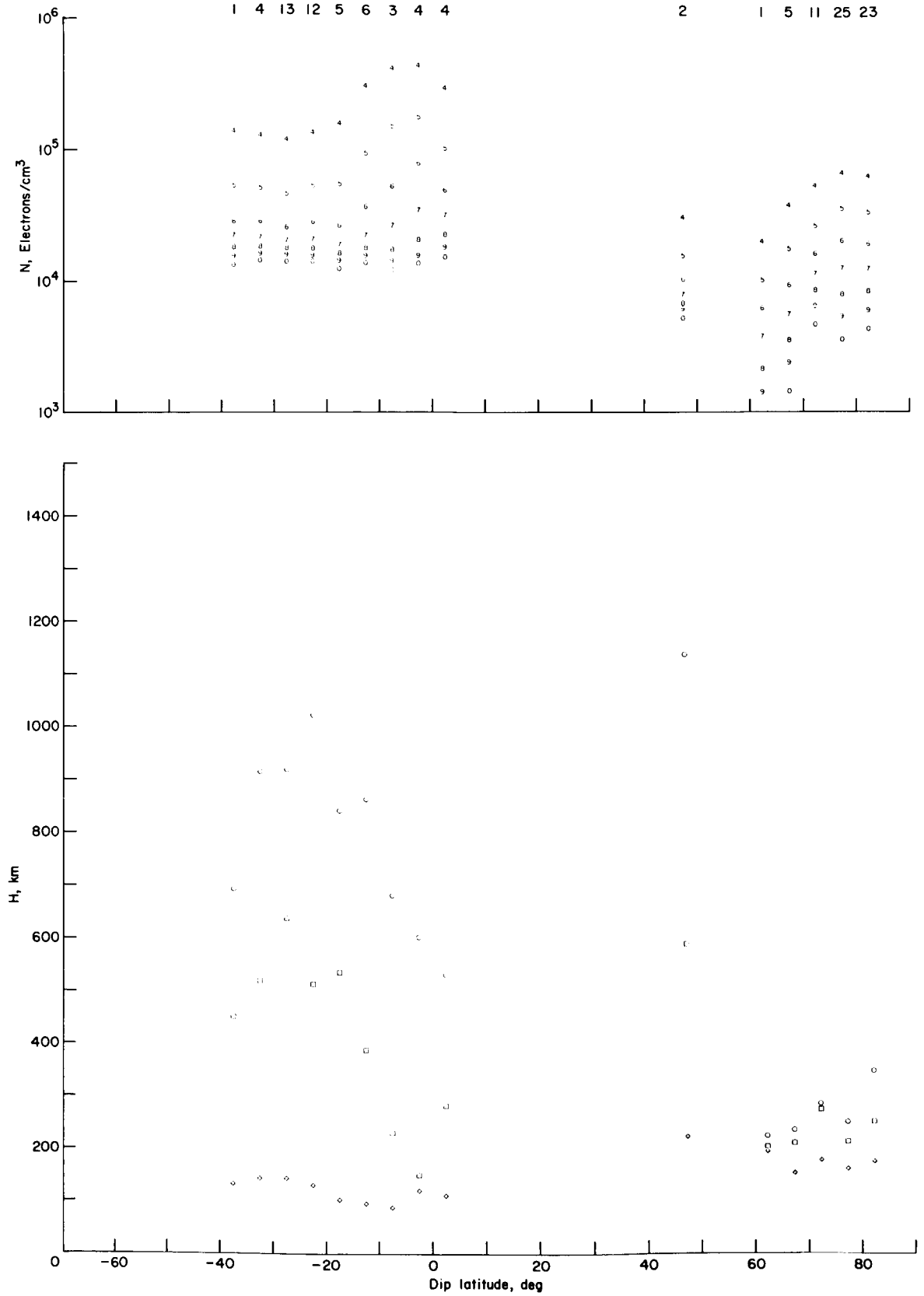

1 4 13 12 5 6 3 4 4
2
1 5 11 25 23
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 177

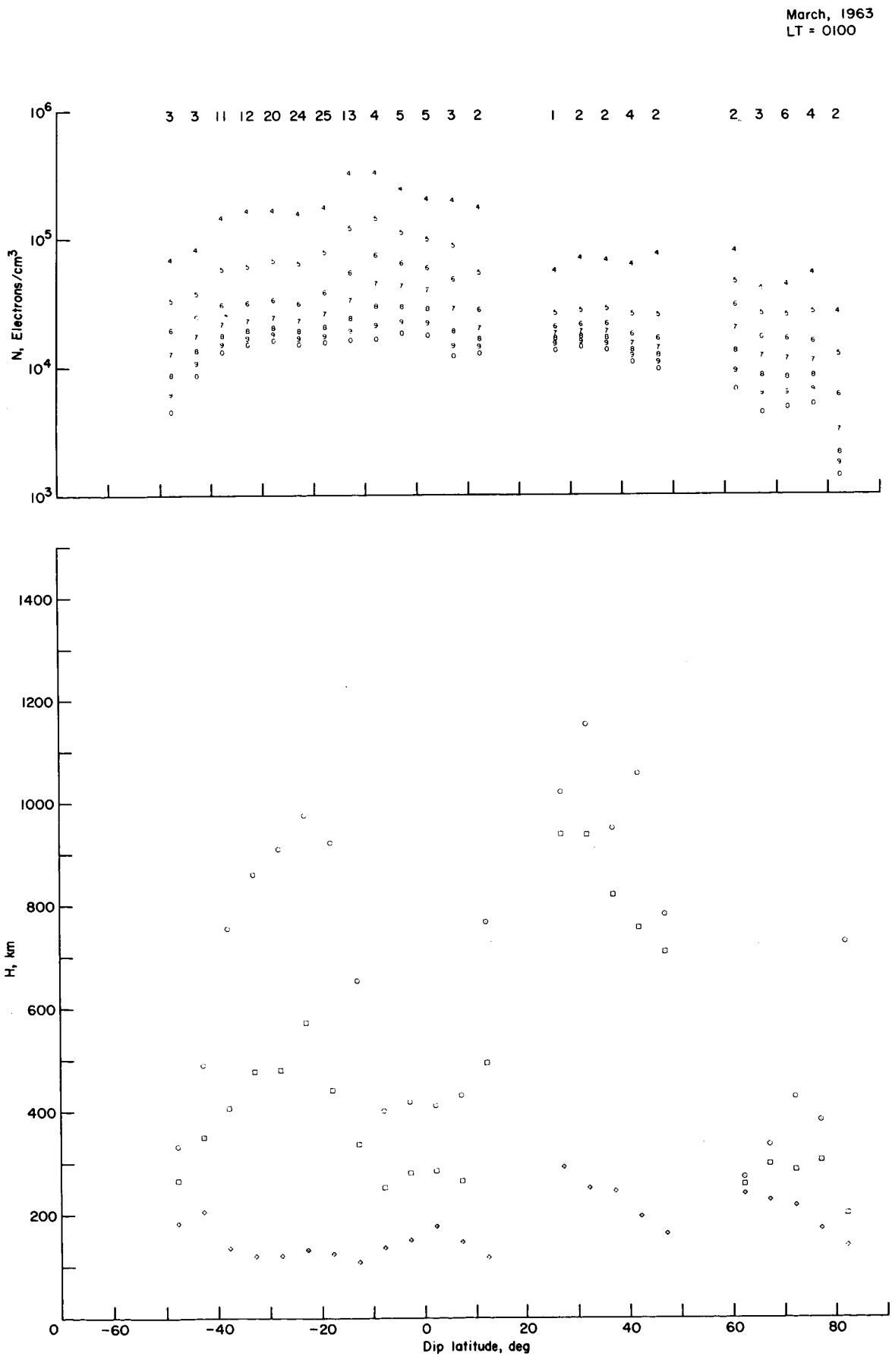

March, 1963
LT = 0100
3 3 11 12 20 24 25 13 4 5 5 3 2
1 2 2 4 2
2 3 6 4 2
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 178

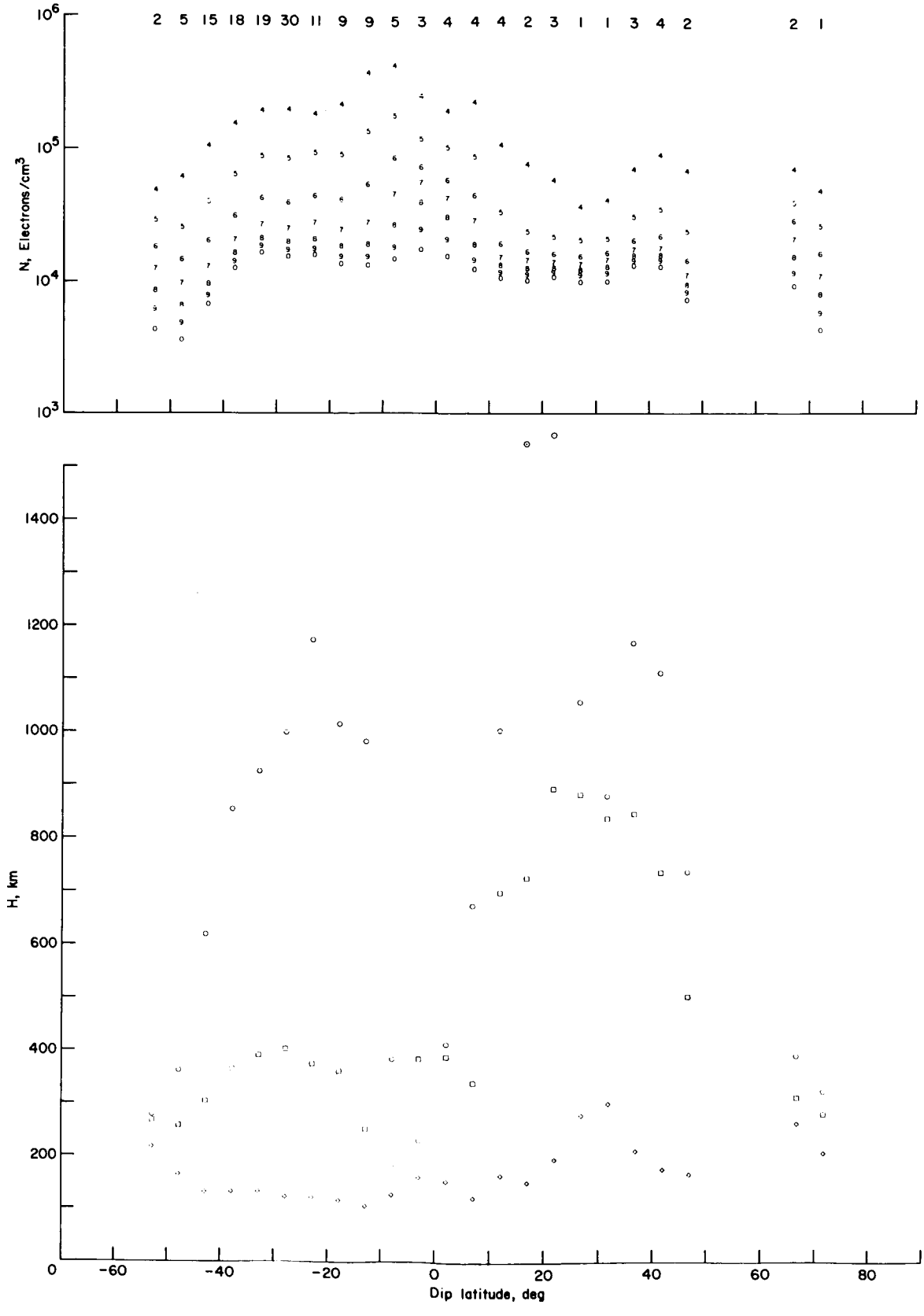

2 5 15 18 19 30 11 9 9 5 3 4 4 4 2 3 1 1 3 4 2 2 1
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 179

March, 1963
LT = 0300

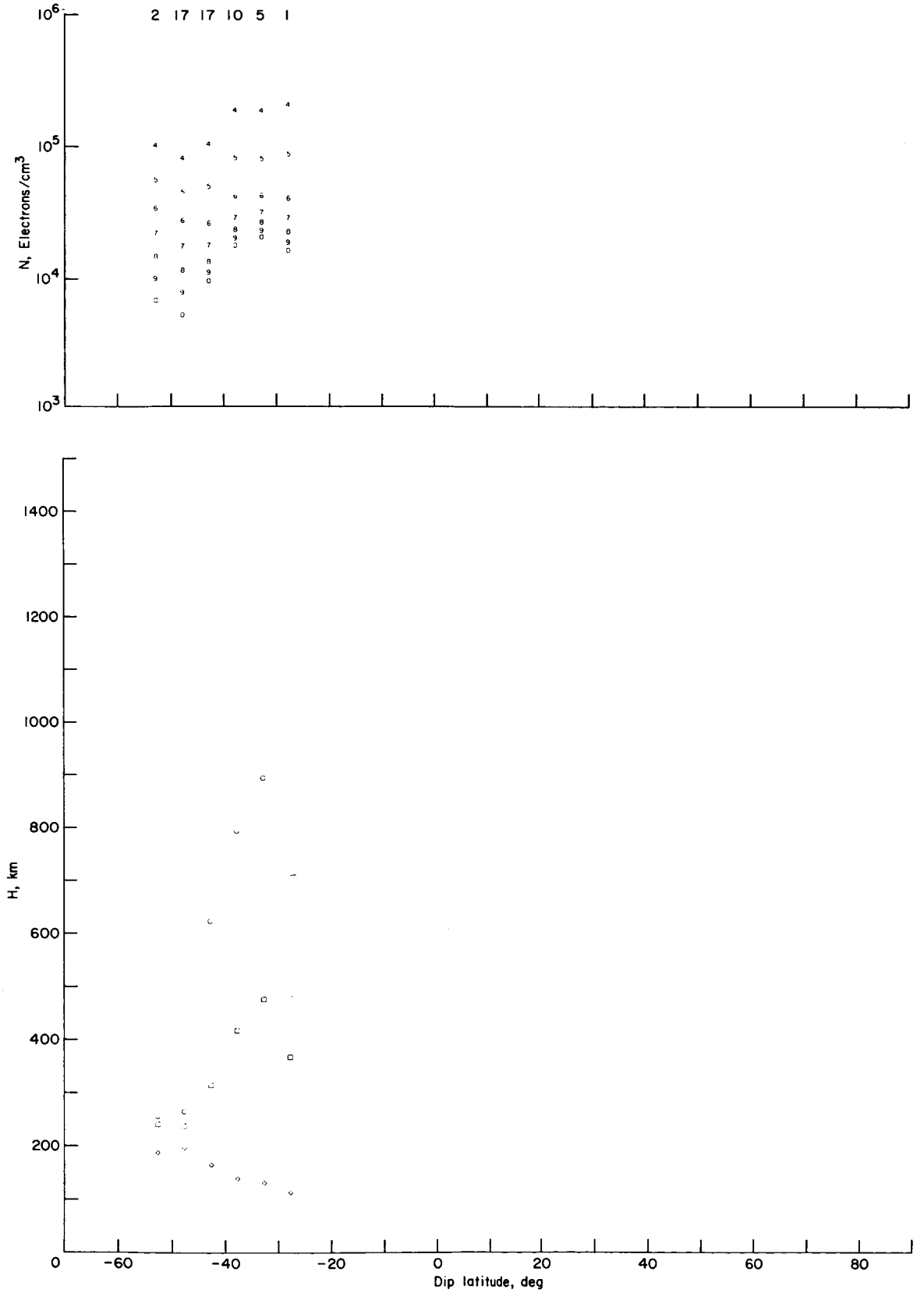


Figure 180

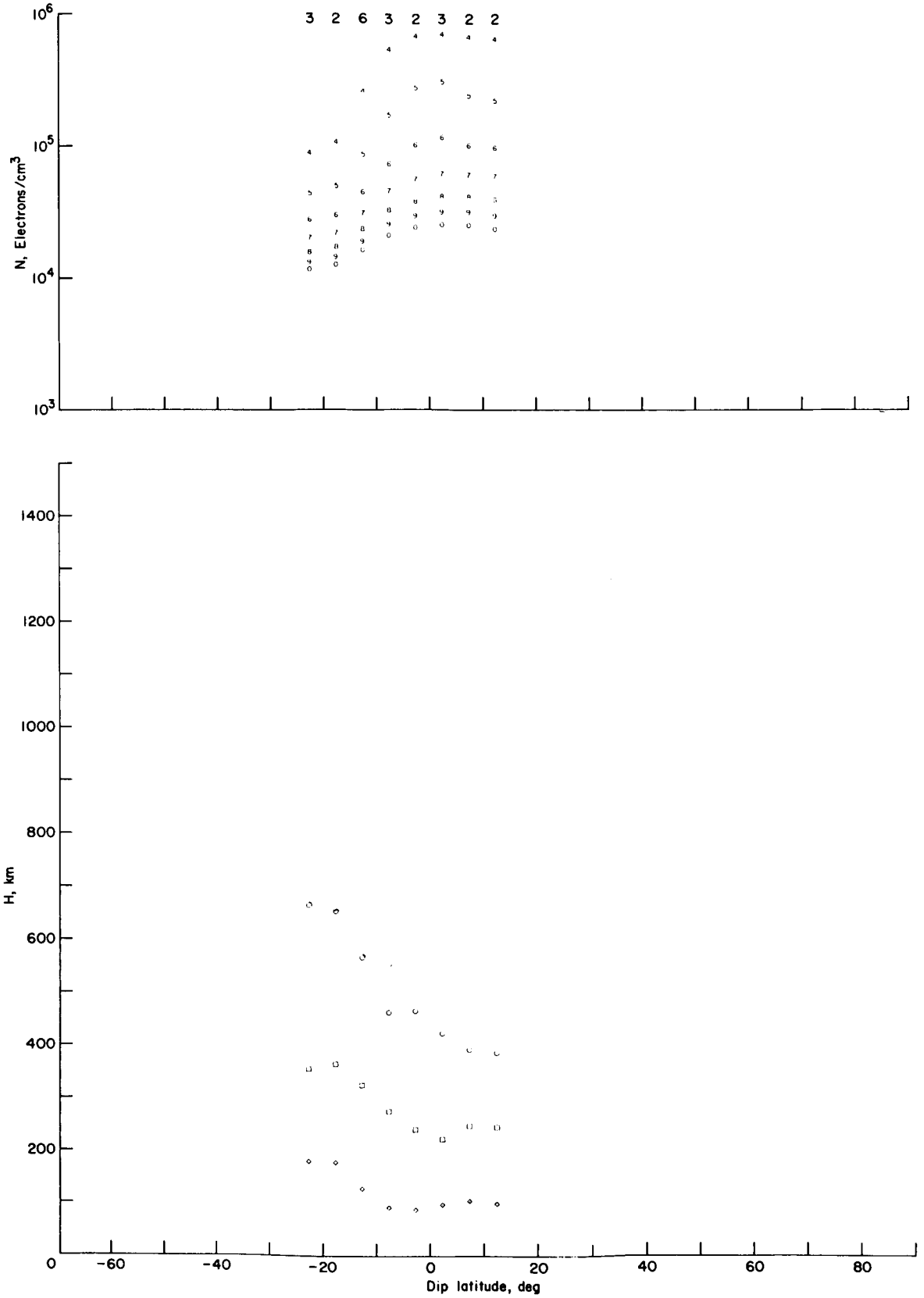

3 2 6 3 2 3 2 2
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 181

March, 1963
LT = 1100

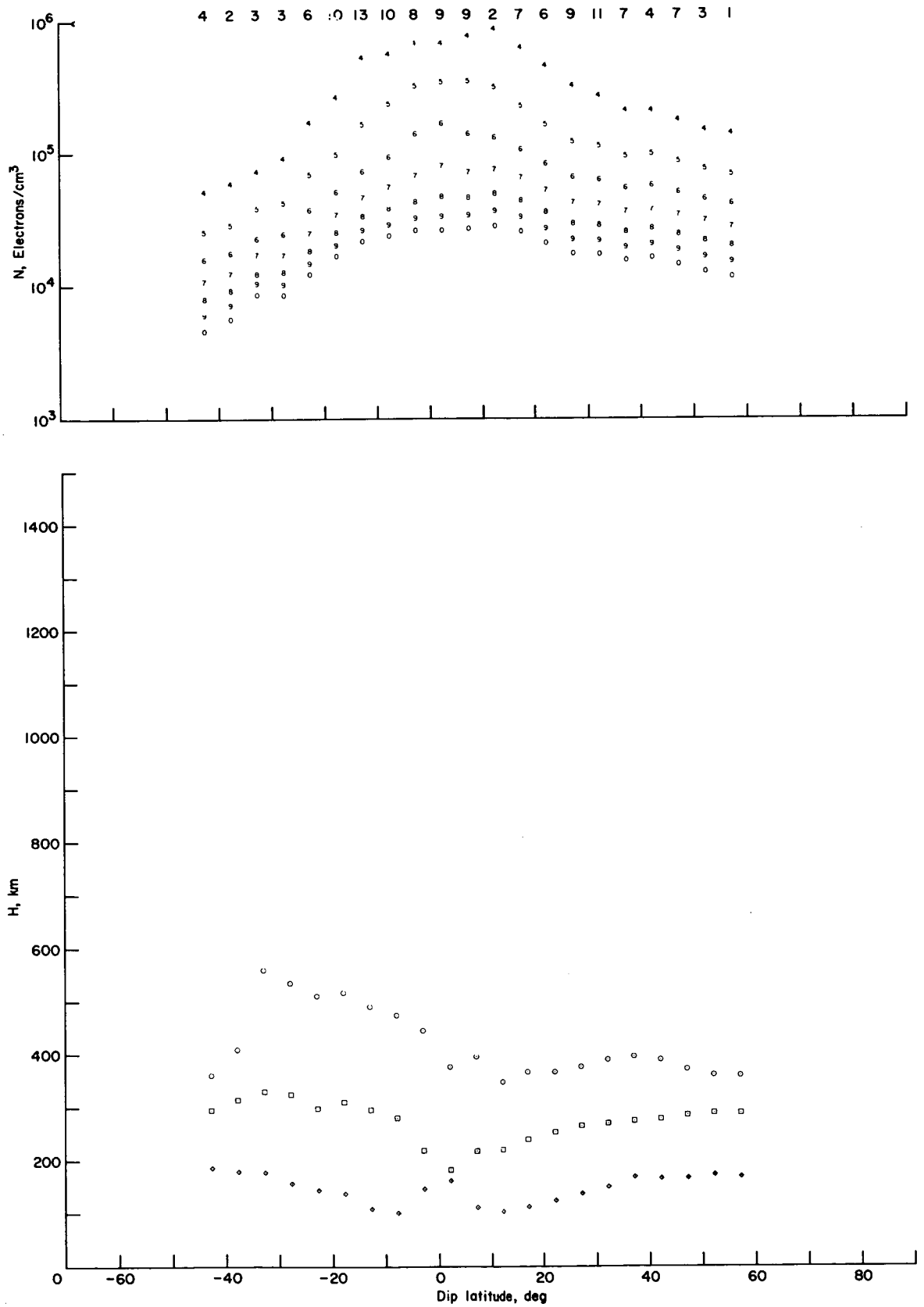


Figure 182

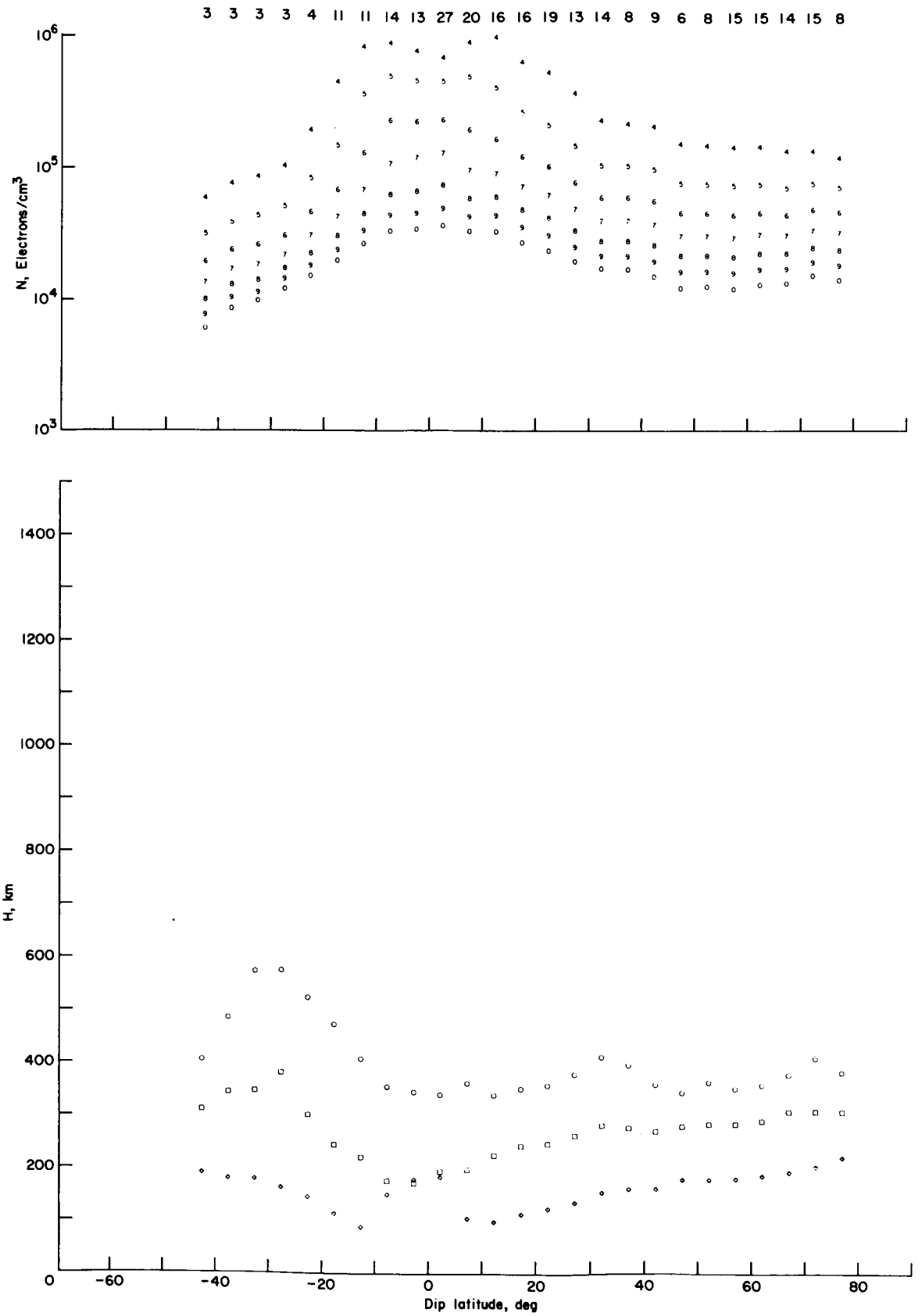

3 3 3 3 4 11 11 14 13 27 20 16 16 19 13 14 8 9 6 8 15 15 14 15 8
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 183

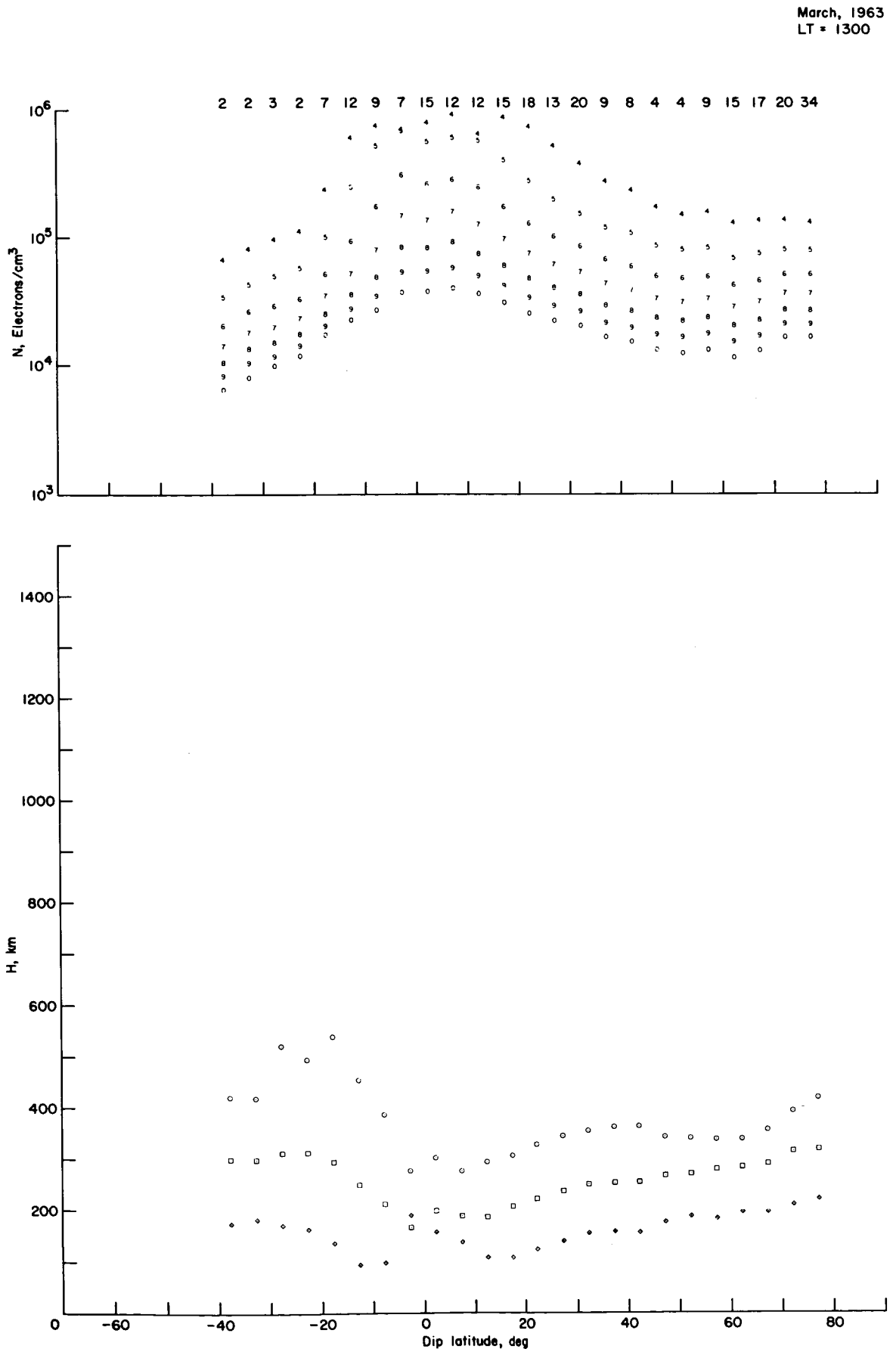

March, 1963
LT = 1300
2 2 3 2 7 12 9 7 15 12 12 15 18 13 20 9 8 4 4 9 15 17 20 34
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 184

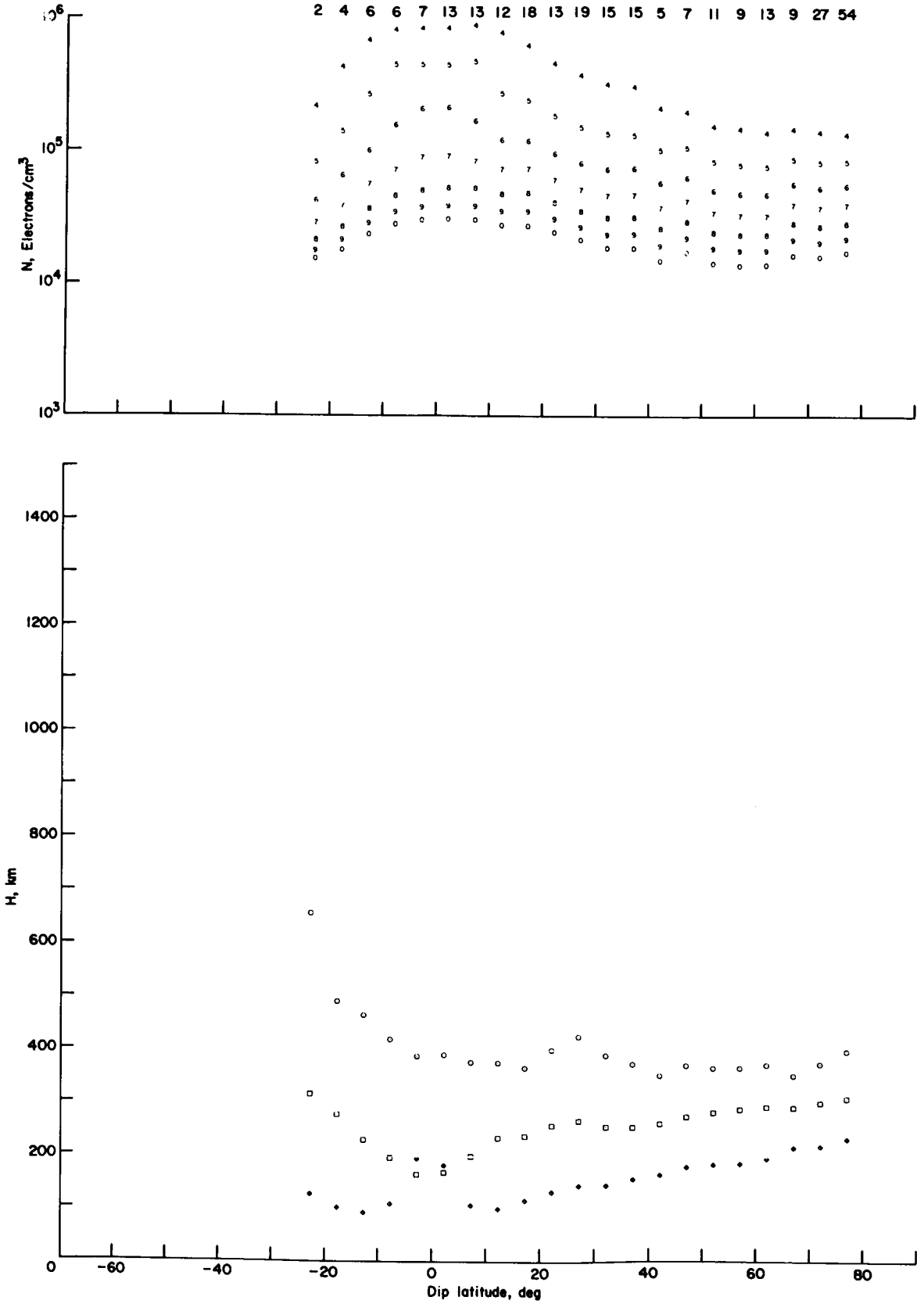

2 4 6 6 7 13 13 12 18 13 19 15 15 5 7 11 9 13 9 27 54
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 185

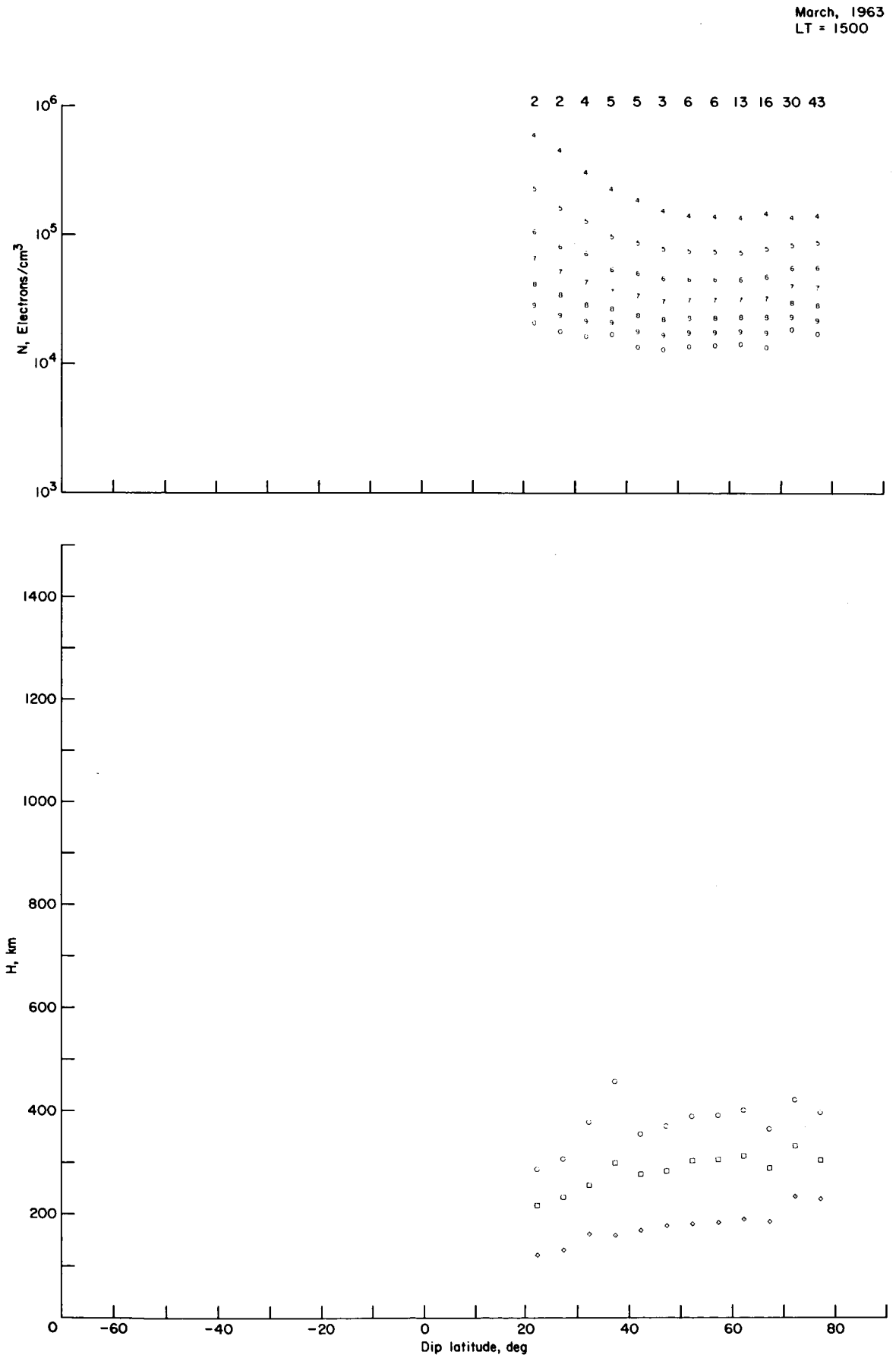

March, 1963
LT = 1500
2 2 4 5 5 3 6 6 13 16 30 43
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 186

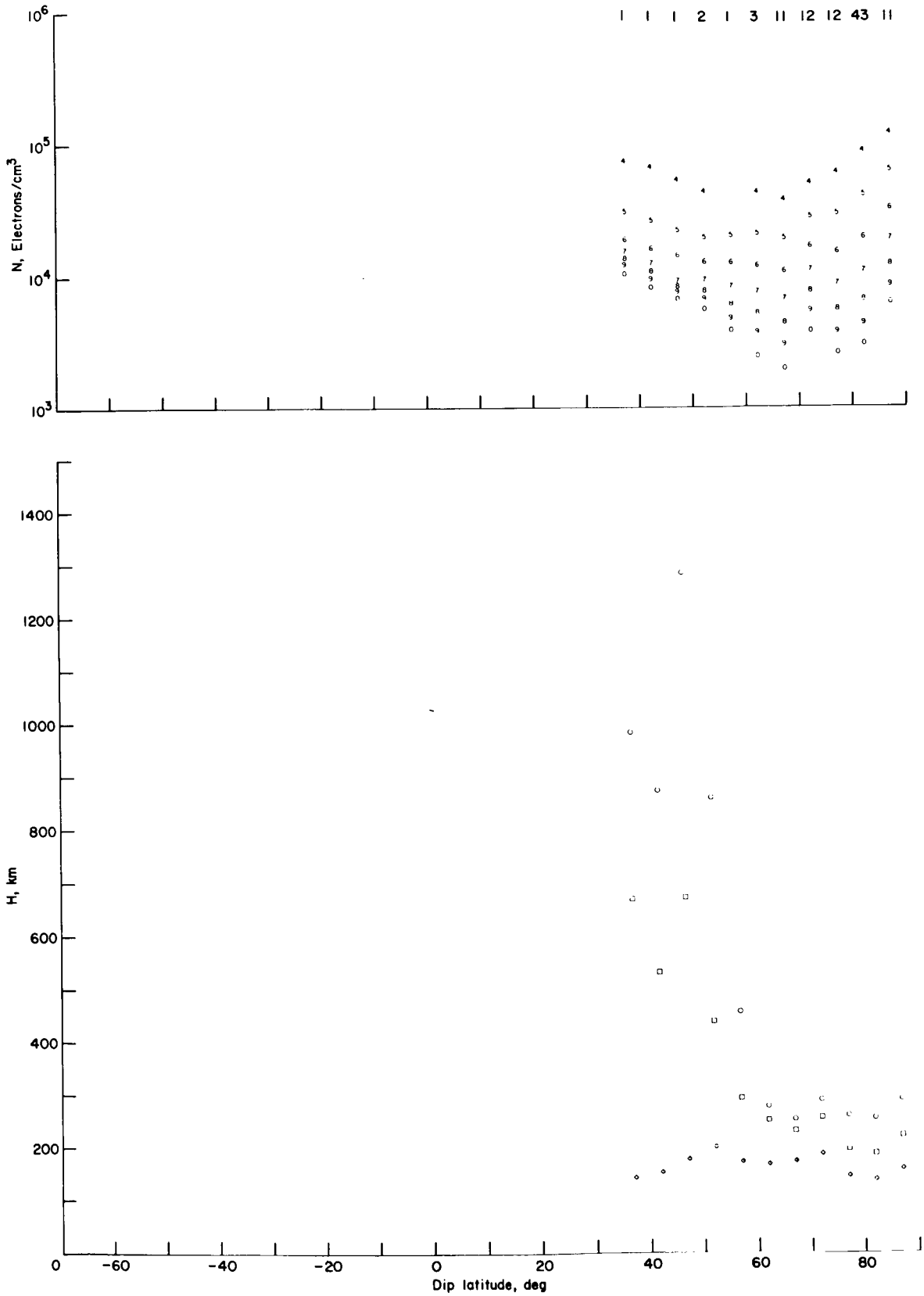

N, Electrons/cm3
10^6
10^5
10^4
10^3
1 1 1 2 1 3 11 12 12 43 11
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 187

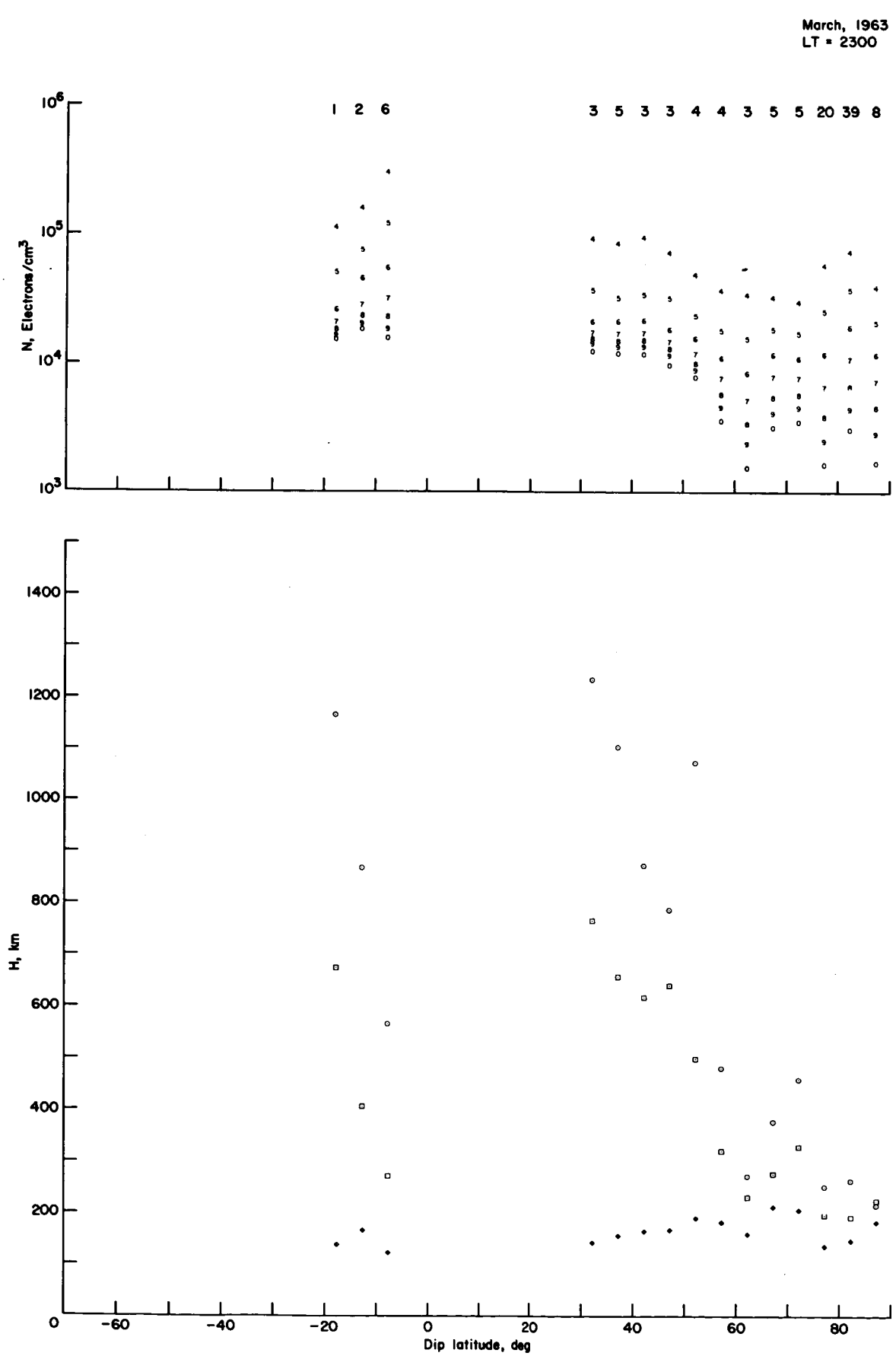

March, 1963
LT = 2300
1 2 6 3 5 3 3 4 4 3 5 5 20 39 8
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 188

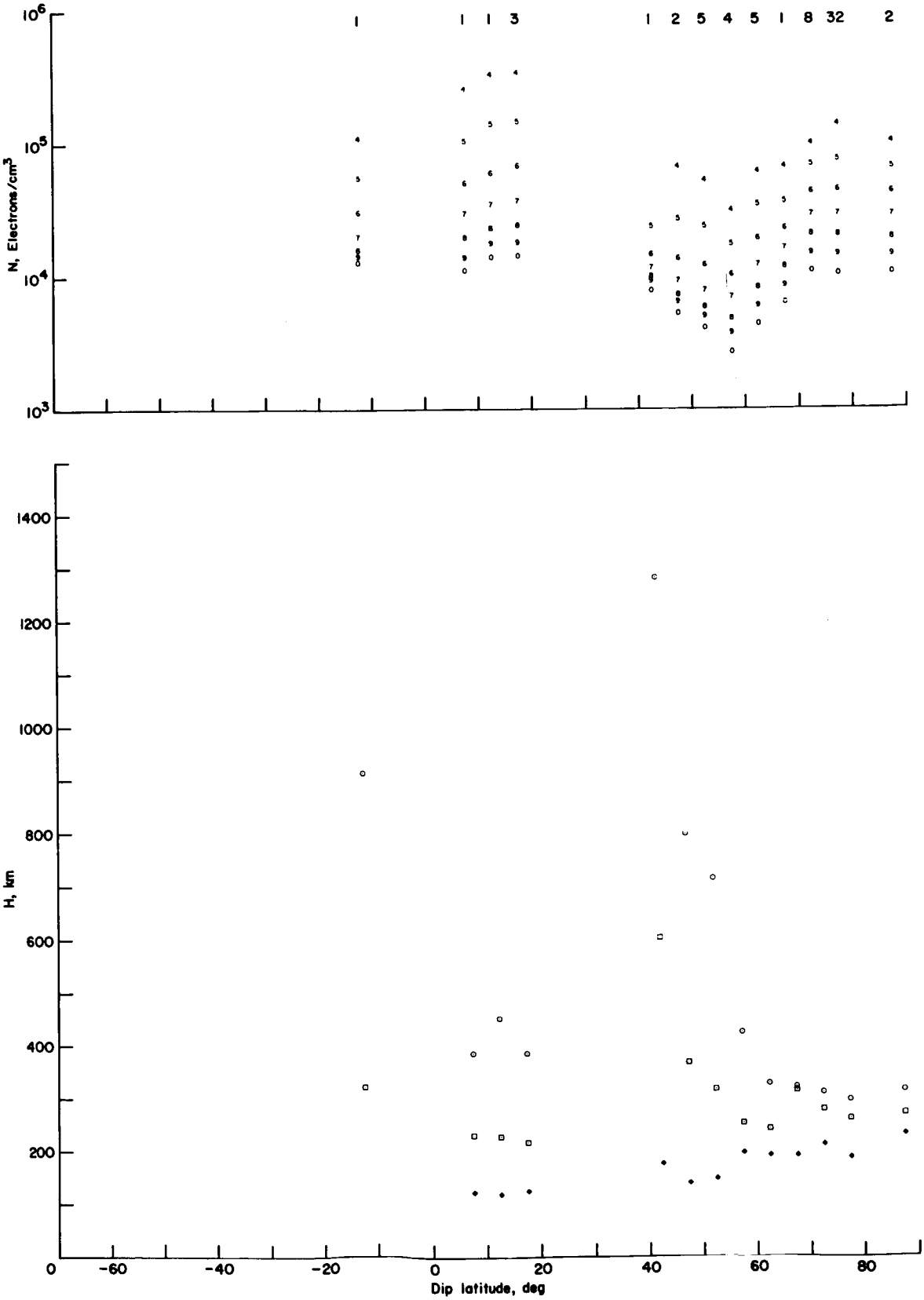

N, Electrons/cm³
10⁶
10⁵
10⁴
10³
1 1 1 3 1 2 5 4 5 1 8 32 2
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 189

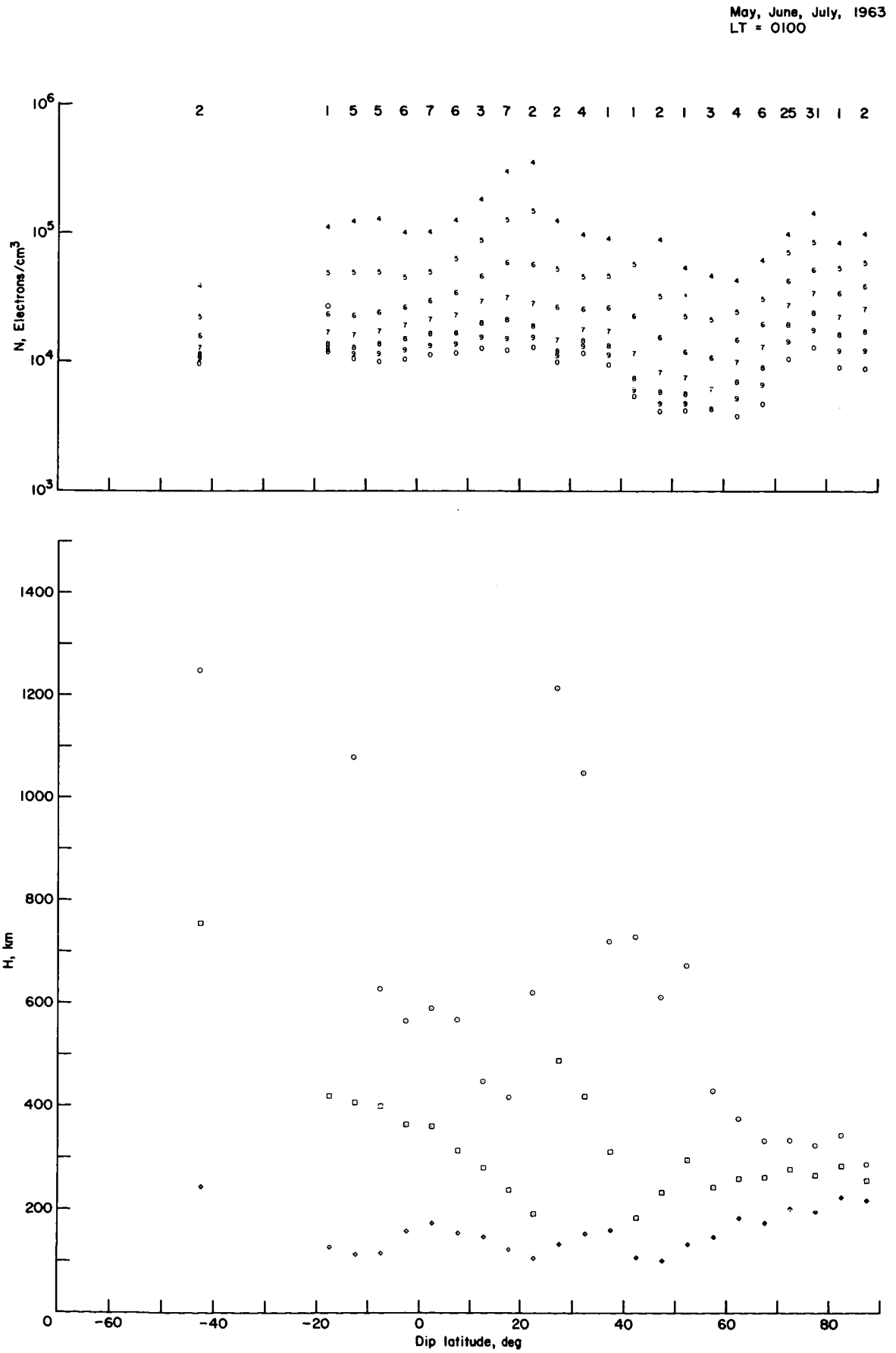

May, June, July, 1963
LT = 0100
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 190

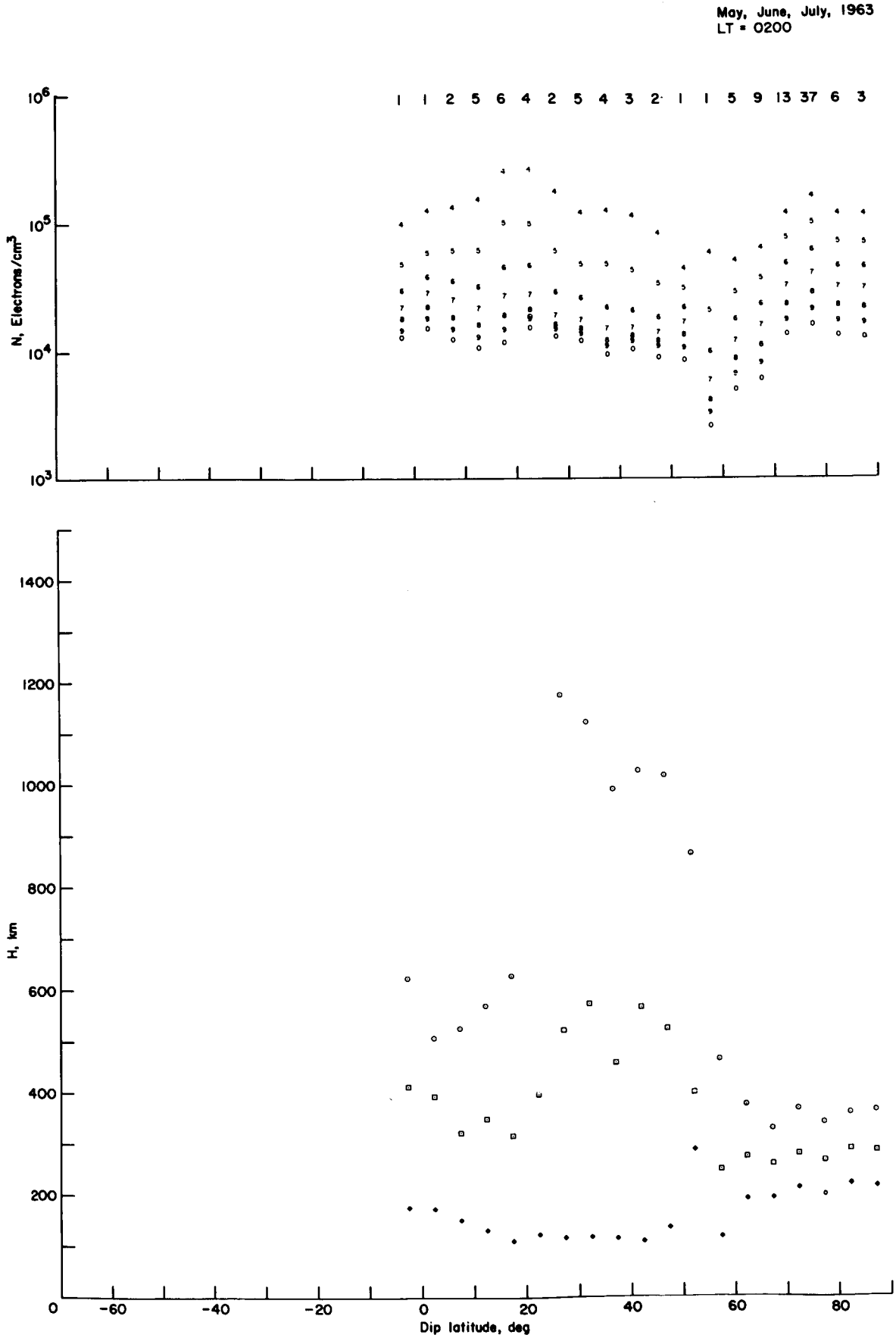

May, June, July, 1963
LT = 0200
1 1 2 5 6 4 2 5 4 3 2 1 1 5 9 13 37 6 3
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 191

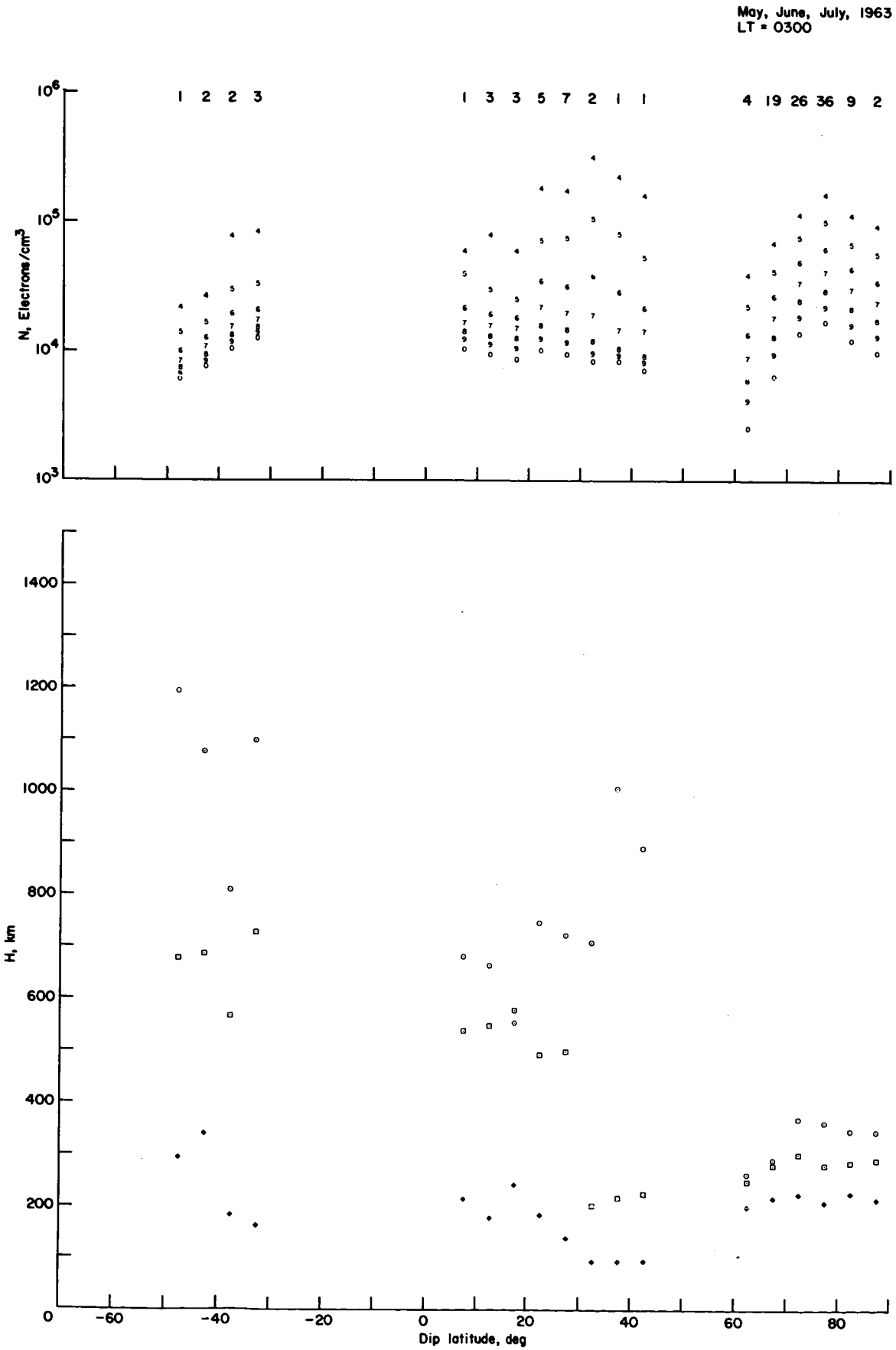

May, June, July, 1963
LT = 0300
1 2 2 3 1 3 3 5 7 2 1 1 4 19 26 36 9 2
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 192

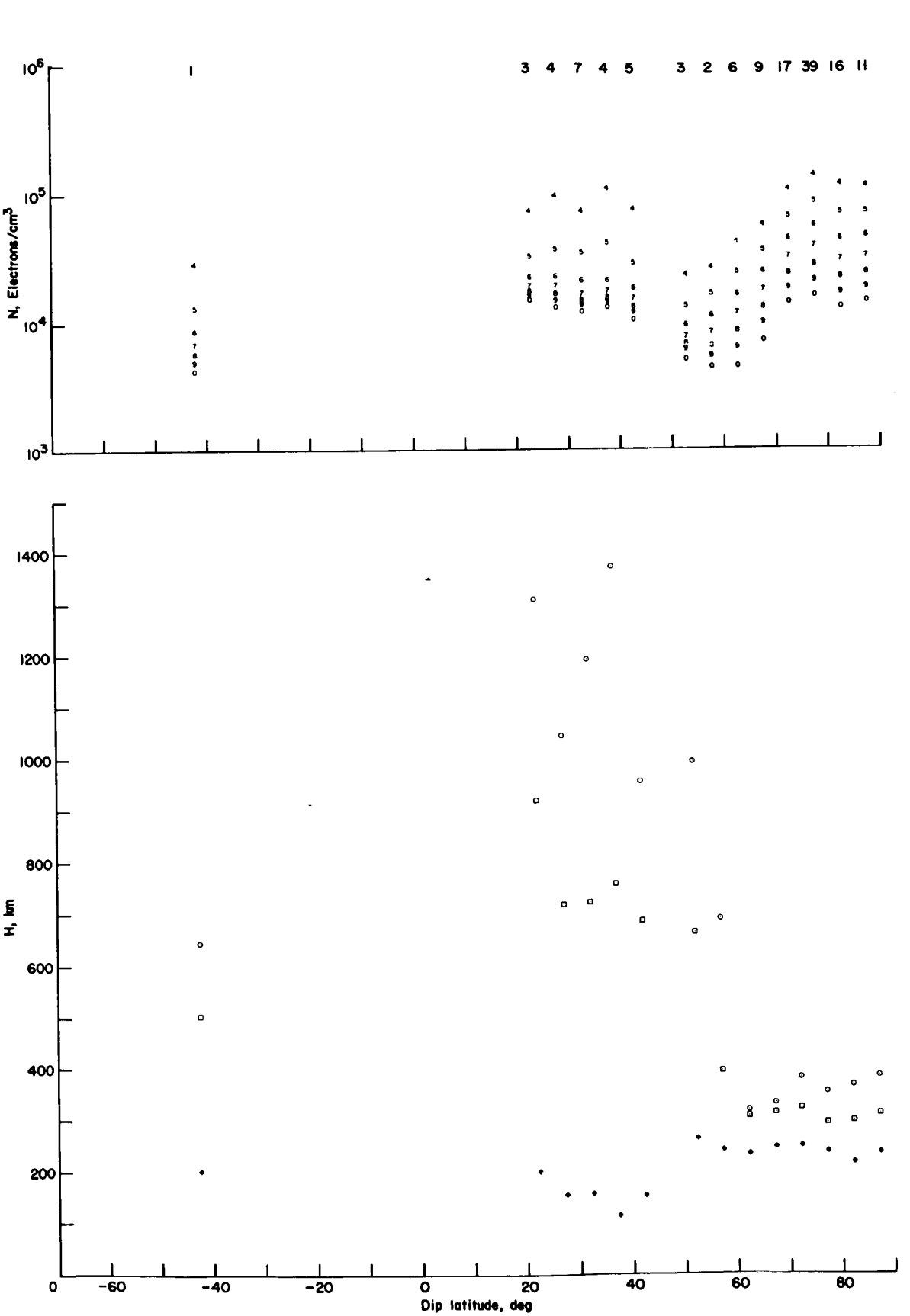

May, June, July 1963
LT = 0400
N, Electrons/cm³
H, km
Dip latitude, deg

Figure 193

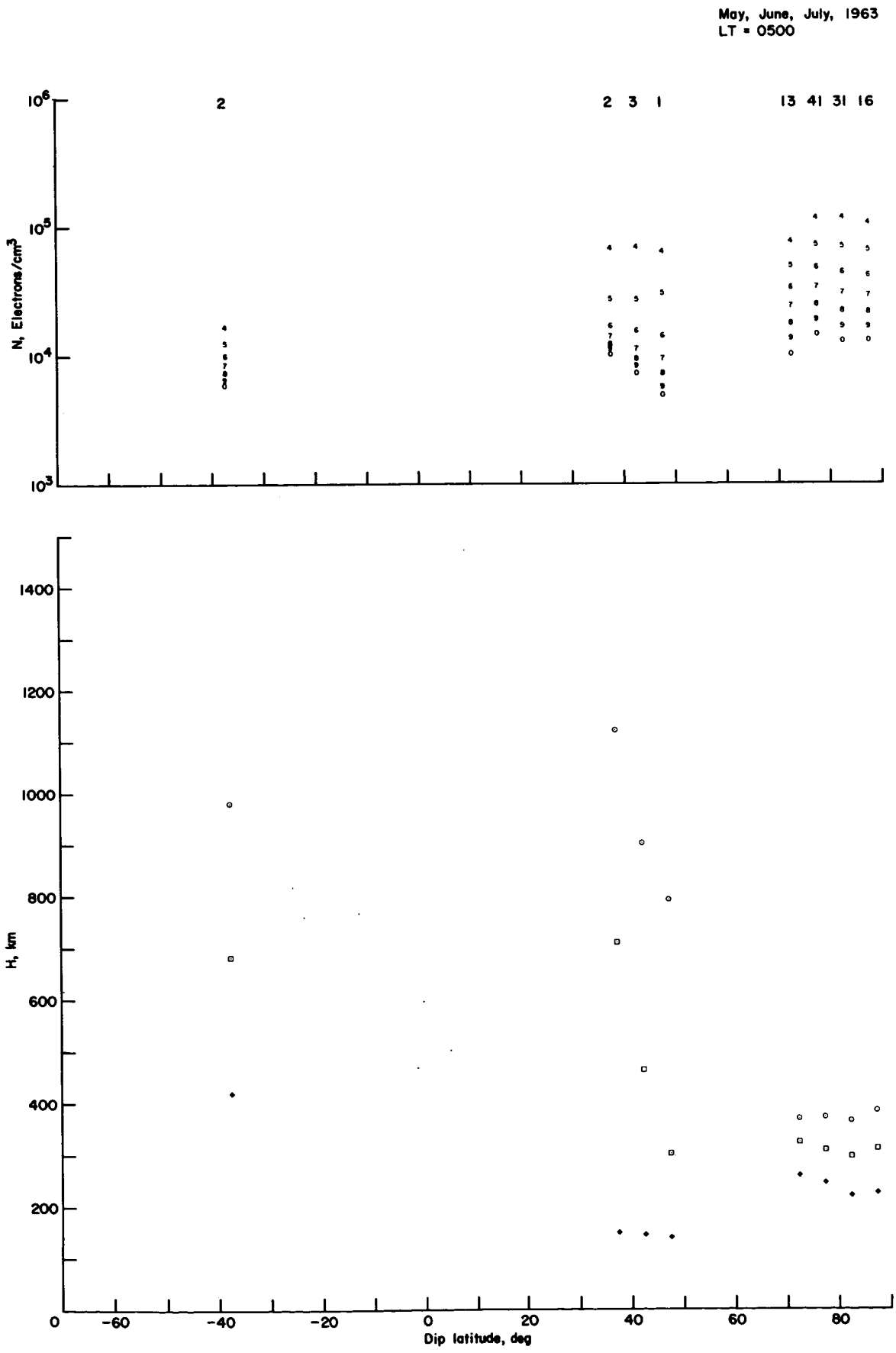

May, June, July, 1963
LT = 0500
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 194

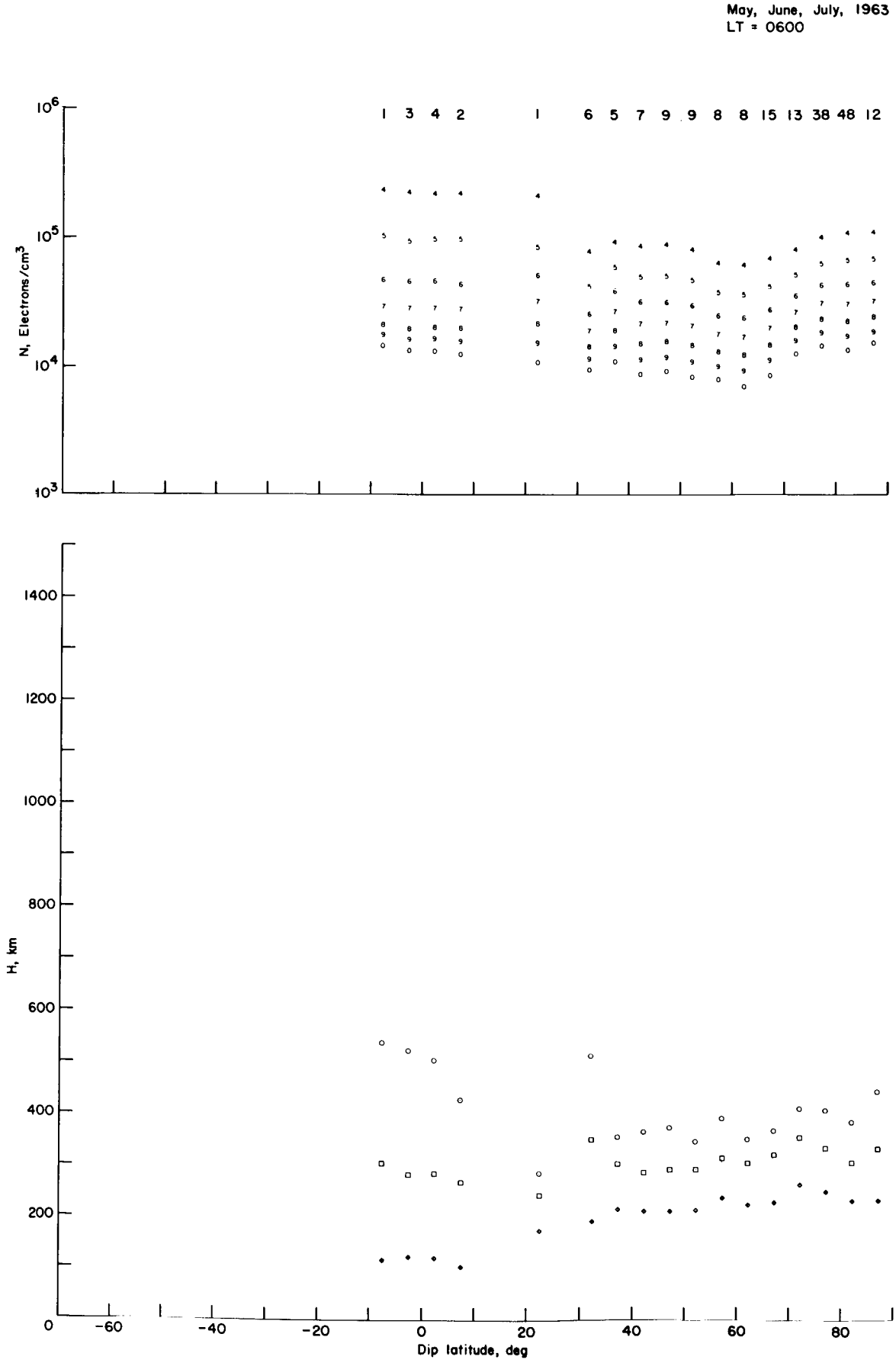

May, June, July, 1963
LT = 0600
1 3 4 2 1 6 5 7 9 9 8 8 15 13 38 48 12
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 195

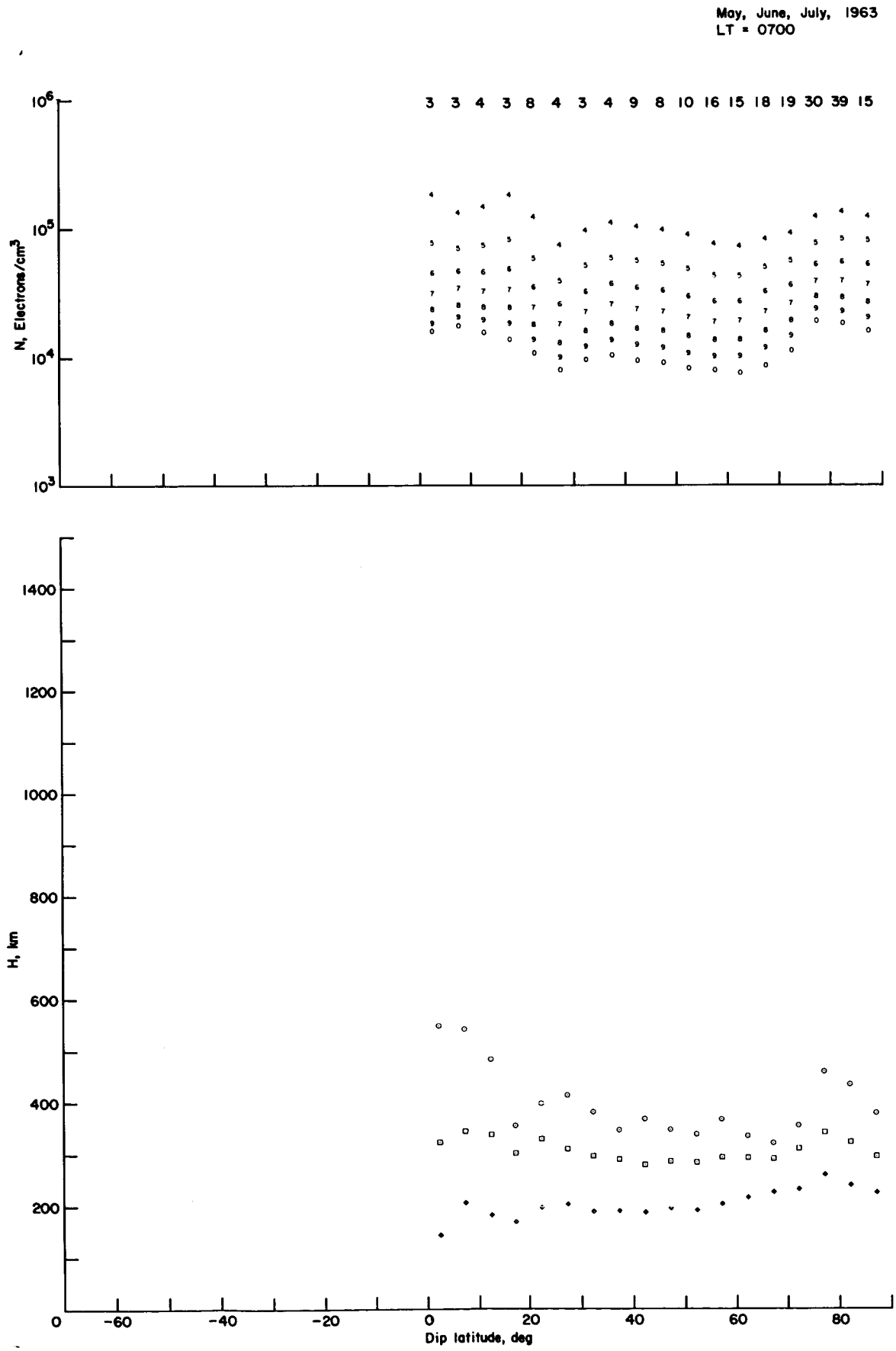

May, June, July, 1963
LT = 0700
3 3 4 3 8 4 3 4 9 8 10 16 15 18 19 30 39 15
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 196

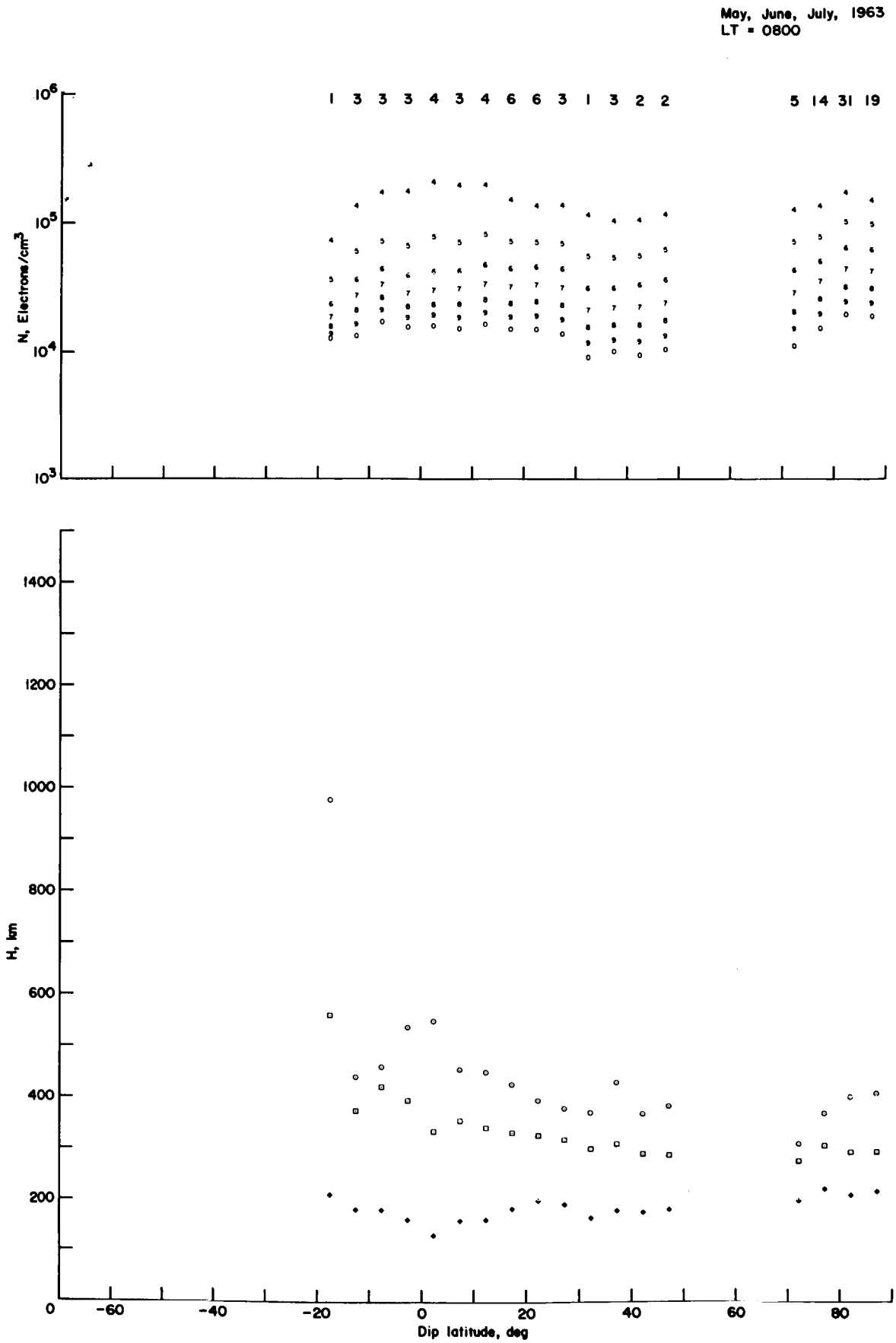

May, June, July, 1963
LT = 0800
1 3 3 3 4 3 4 6 6 3 1 3 2 2
5 14 31 19
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 197

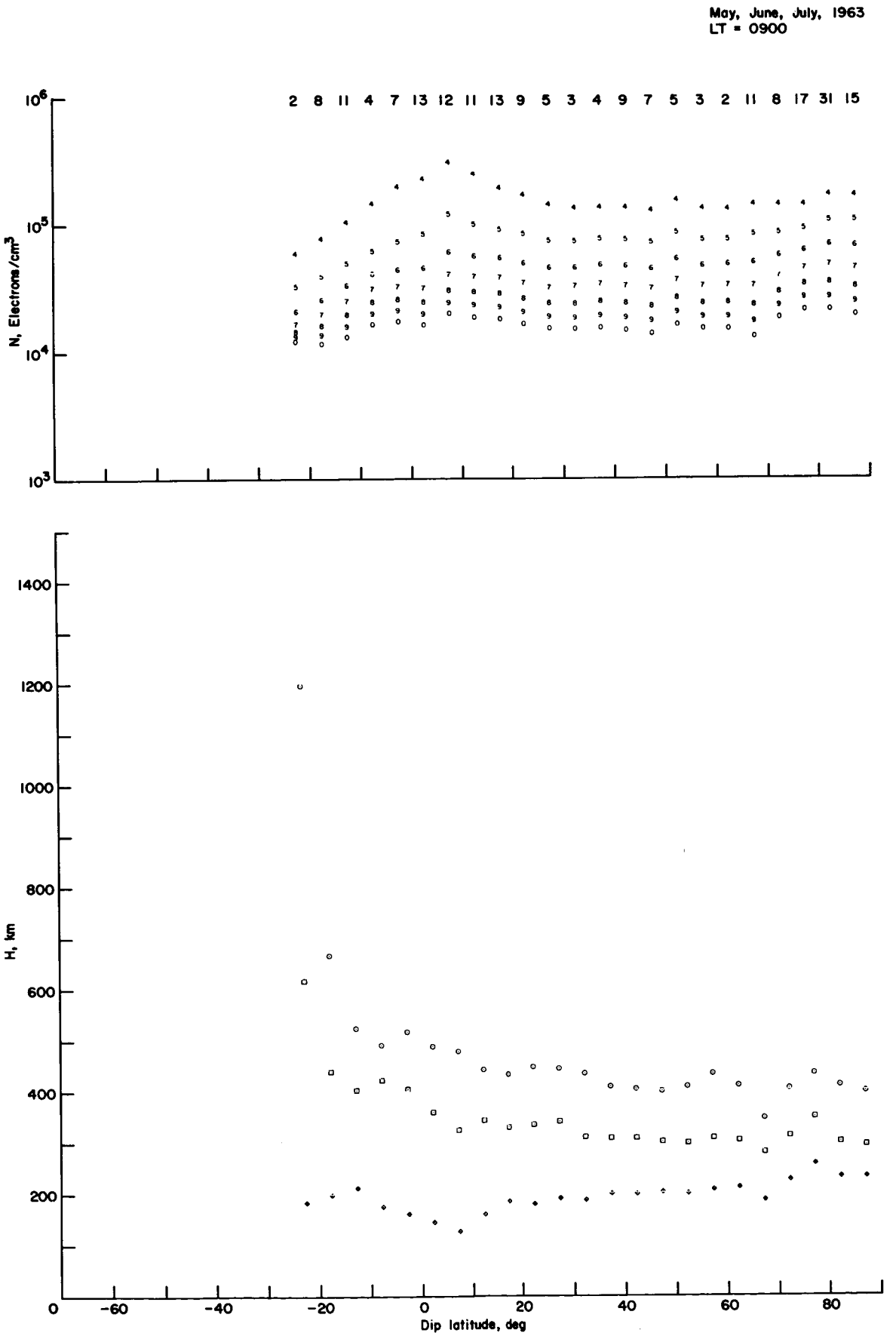

May, June, July, 1963
LT = 0900
2 8 11 4 7 13 12 11 13 9 5 3 4 9 7 5 3 2 11 8 17 31 15
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 198

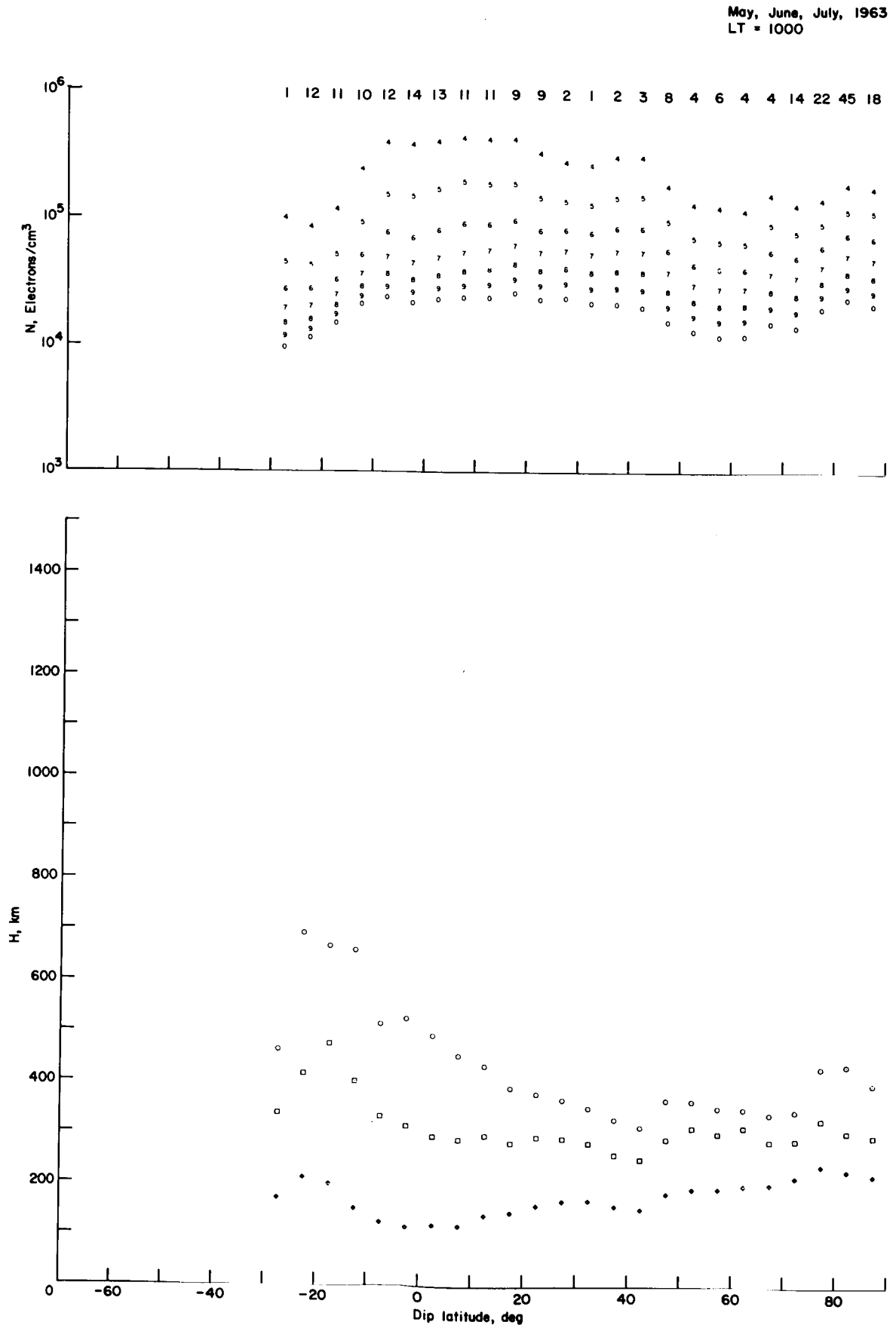

May, June, July, 1963
LT = 1000
1 12 11 10 12 14 13 11 11 9 9 2 1 2 3 8 4 6 4 4 14 22 45 18
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 199

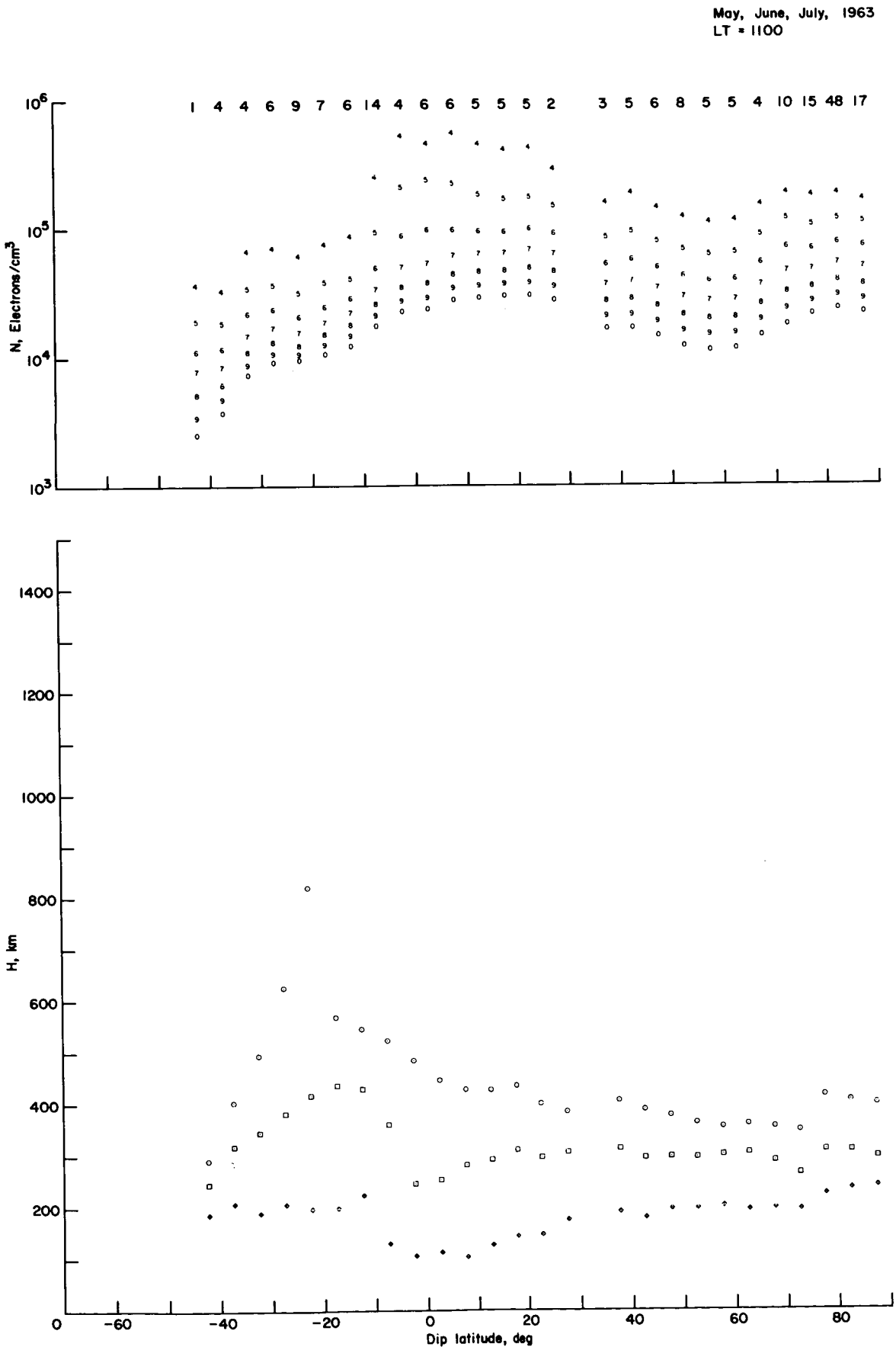

May, June, July, 1963
LT = 1100
1 4 4 6 9 7 6 14 4 6 6 5 5 5 2 3 5 6 8 5 5 4 10 15 48 17
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 200

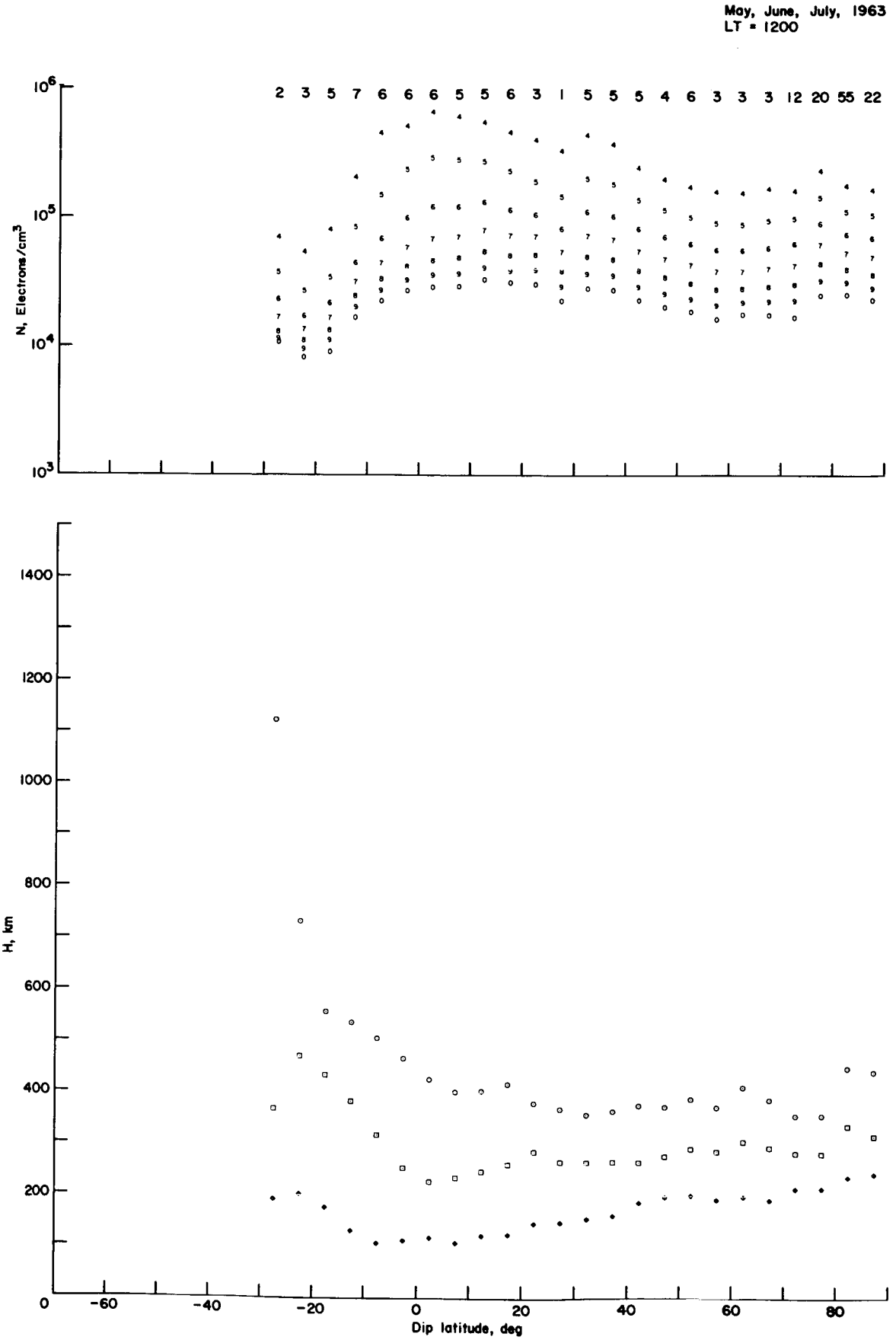

May, June, July, 1963
LT = 1200
2 3 5 7 6 6 6 5 5 6 3 1 5 5 5 4 6 3 3 3 12 20 55 22
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 201

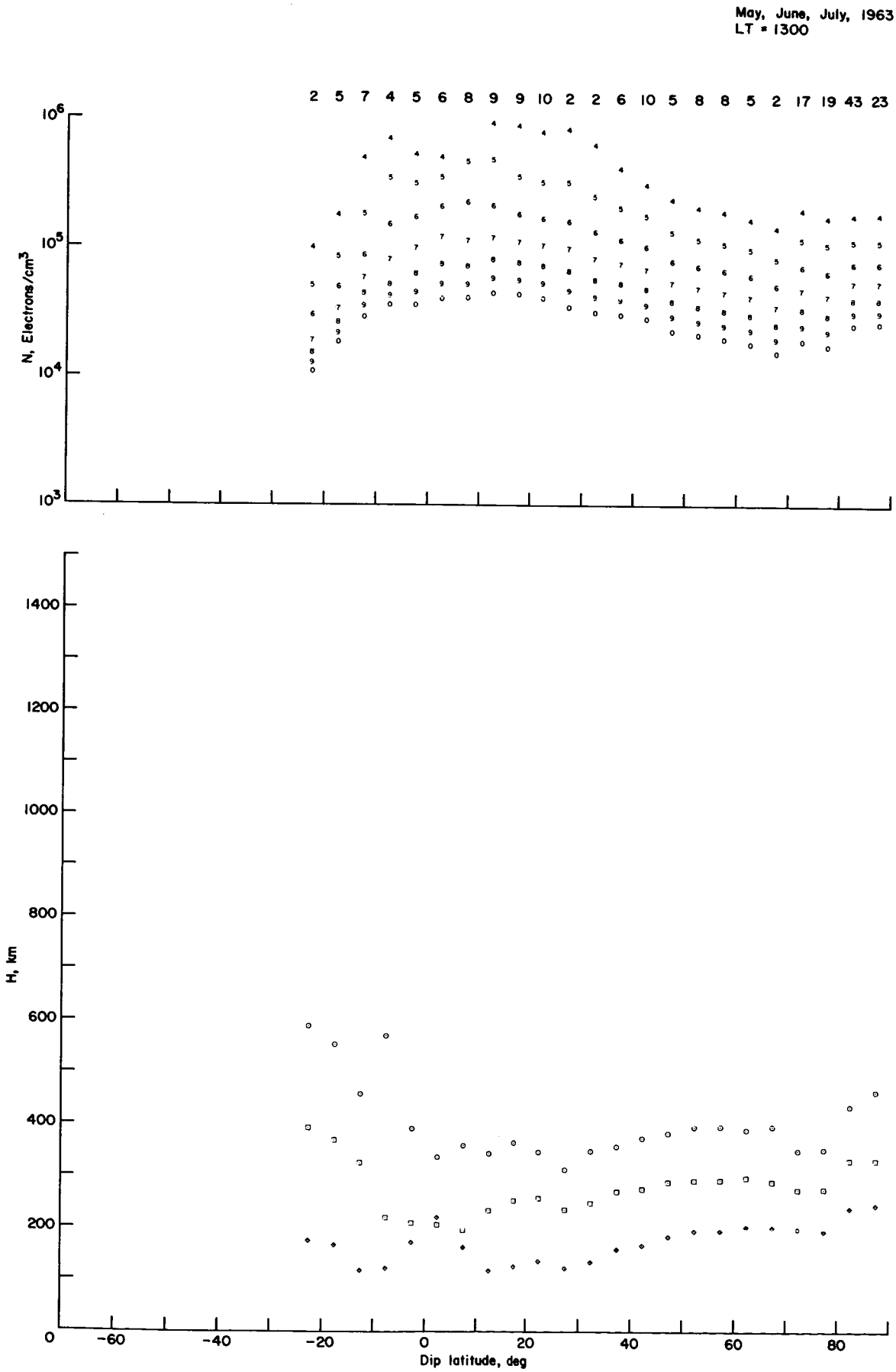

May, June, July, 1963
LT = 1300
2 5 7 4 5 6 8 9 9 10 2 2 6 10 5 8 8 5 2 17 19 43 23
10^6
10^5
10^4
10^3
N, Electrons/cm^3
1400
1200
1000
800
600
400
200
0
H, km
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 202

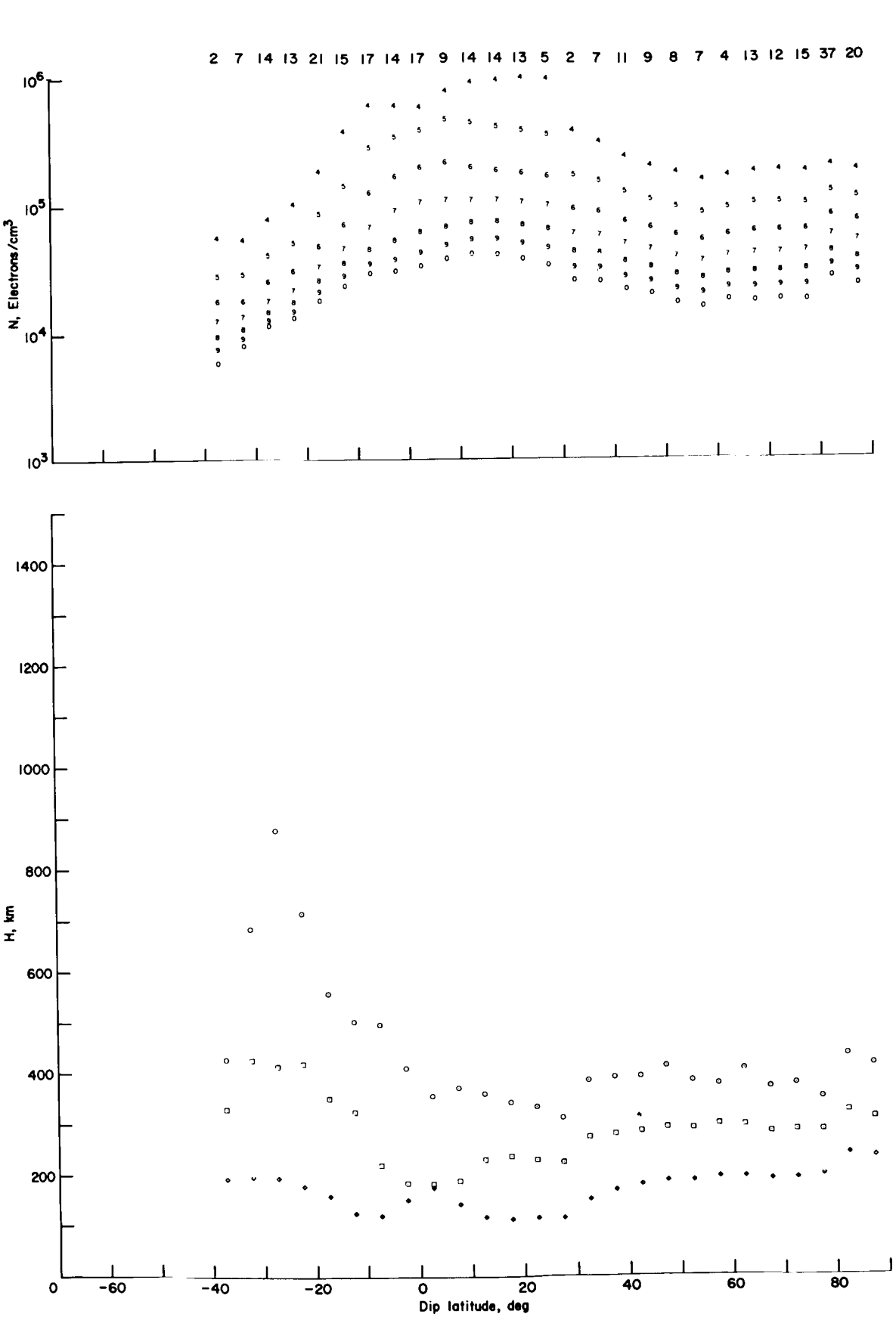

May, June, July, 1963
LT = 1400
2 7 14 13 21 15 17 14 17 9 14 14 13 5 2 7 11 9 8 7 4 13 12 15 37 20
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 203

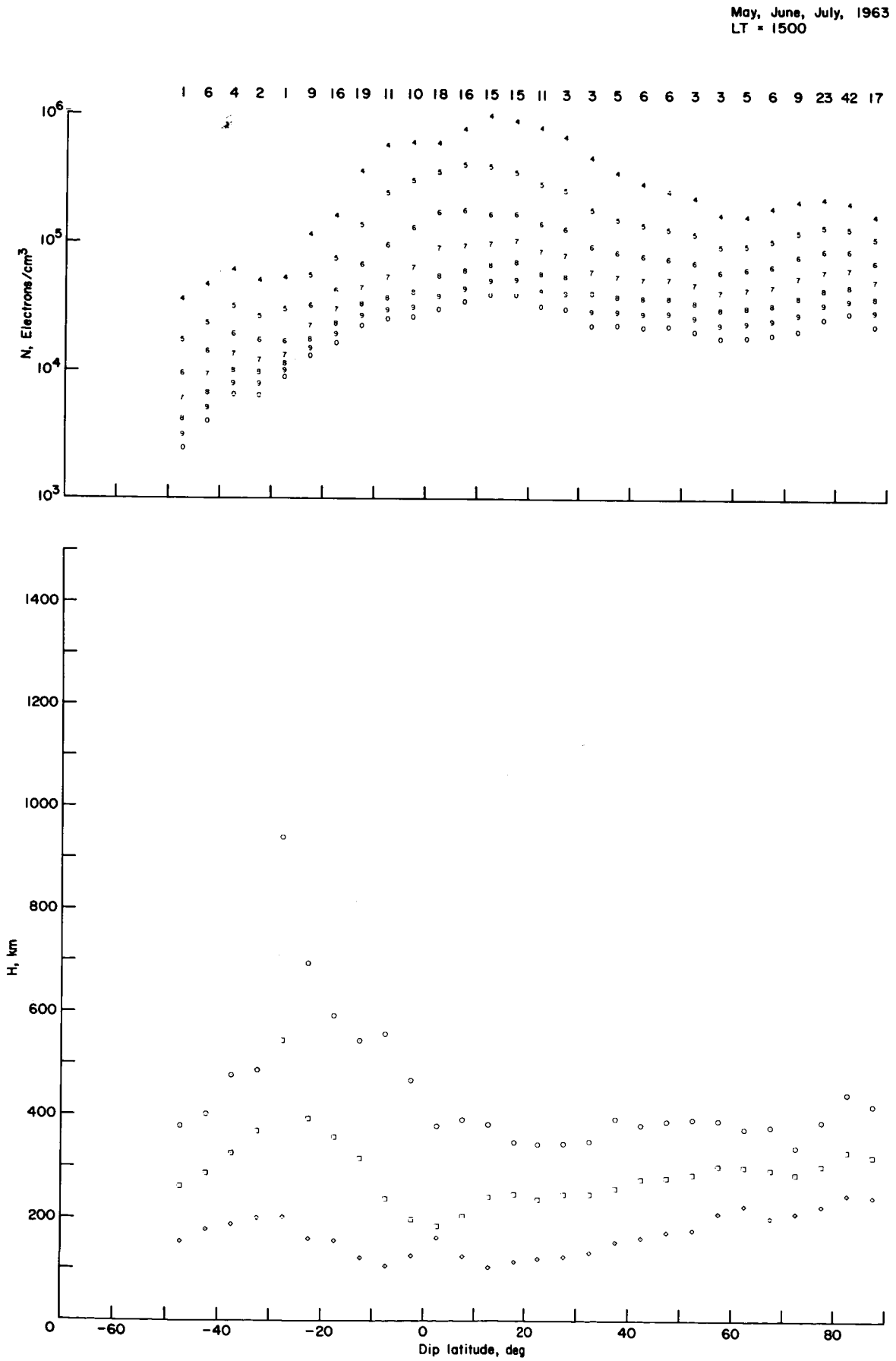

May, June, July, 1963
LT = 1500
1 6 4 2 1 9 16 19 11 10 18 16 15 15 11 3 3 5 6 6 3 3 5 6 9 23 42 17
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 204

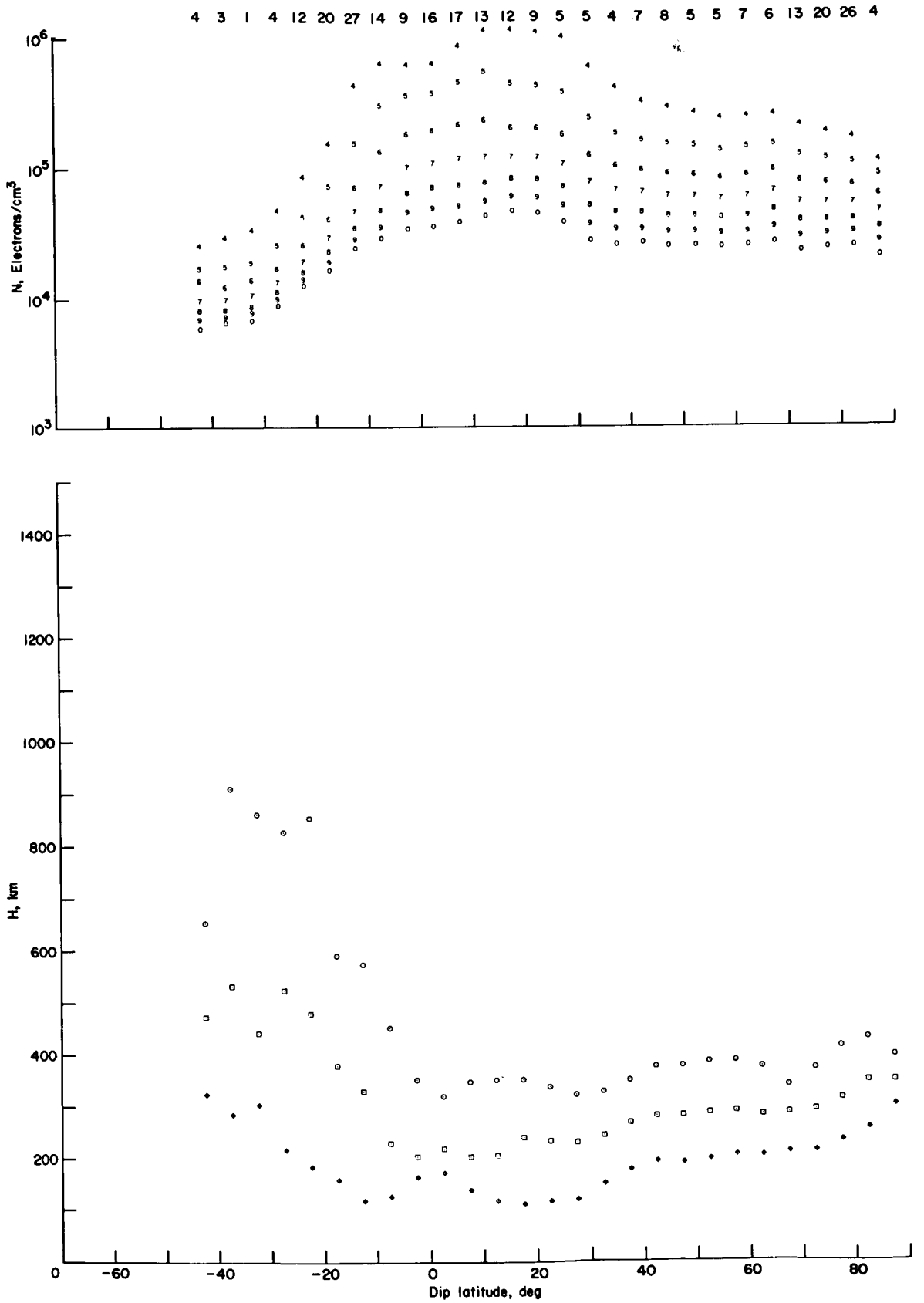

May, June, July, 1963
LT = 1600
4 3 1 4 12 20 27 14 9 16 17 13 12 9 5 5 4 7 8 5 5 7 6 13 20 26 4
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 205

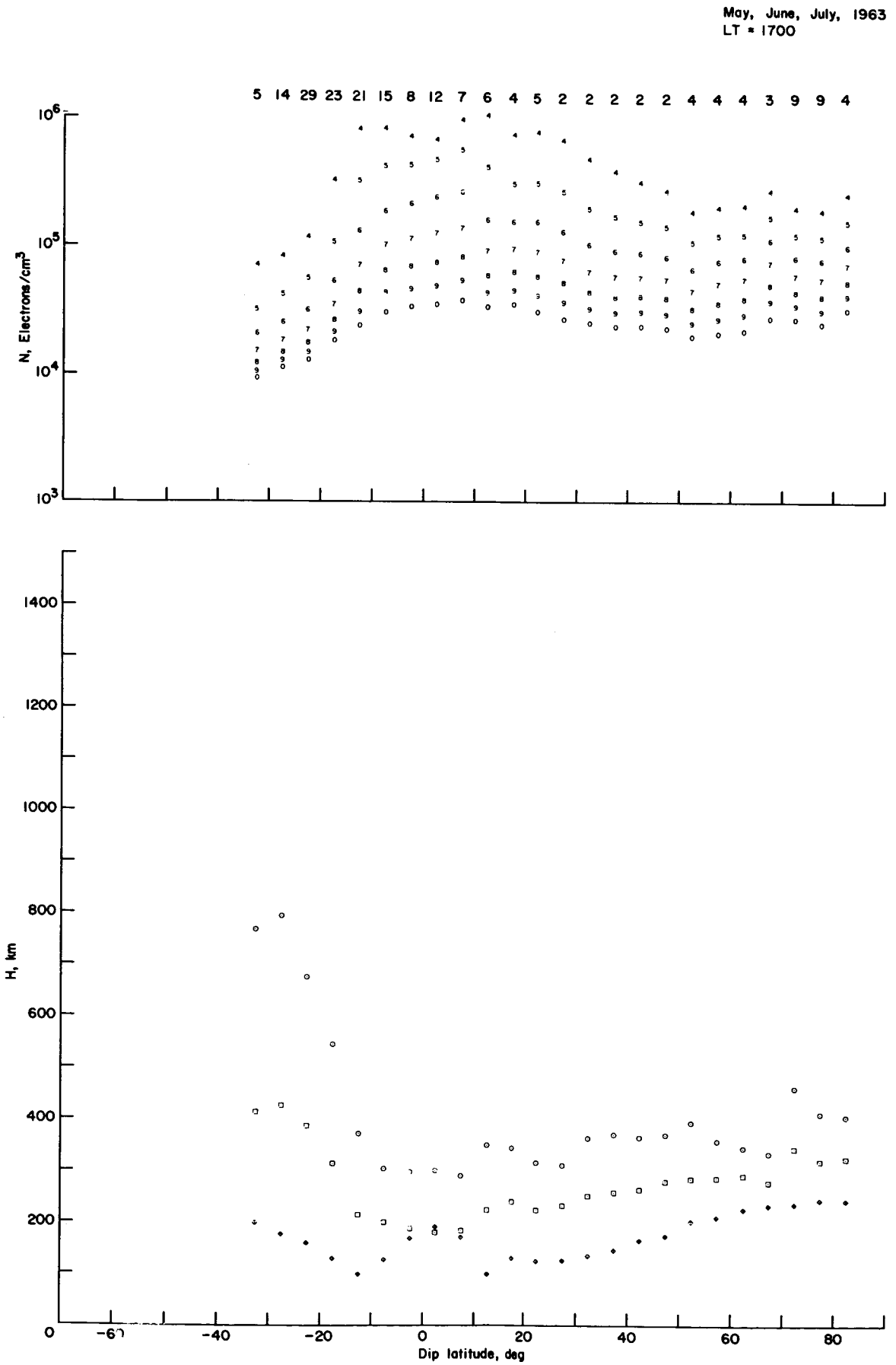

May, June, July, 1963
LT = 1700
5 14 29 23 21 15 8 12 7 6 4 5 2 2 2 2 4 4 4 3 9 9 4
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 206

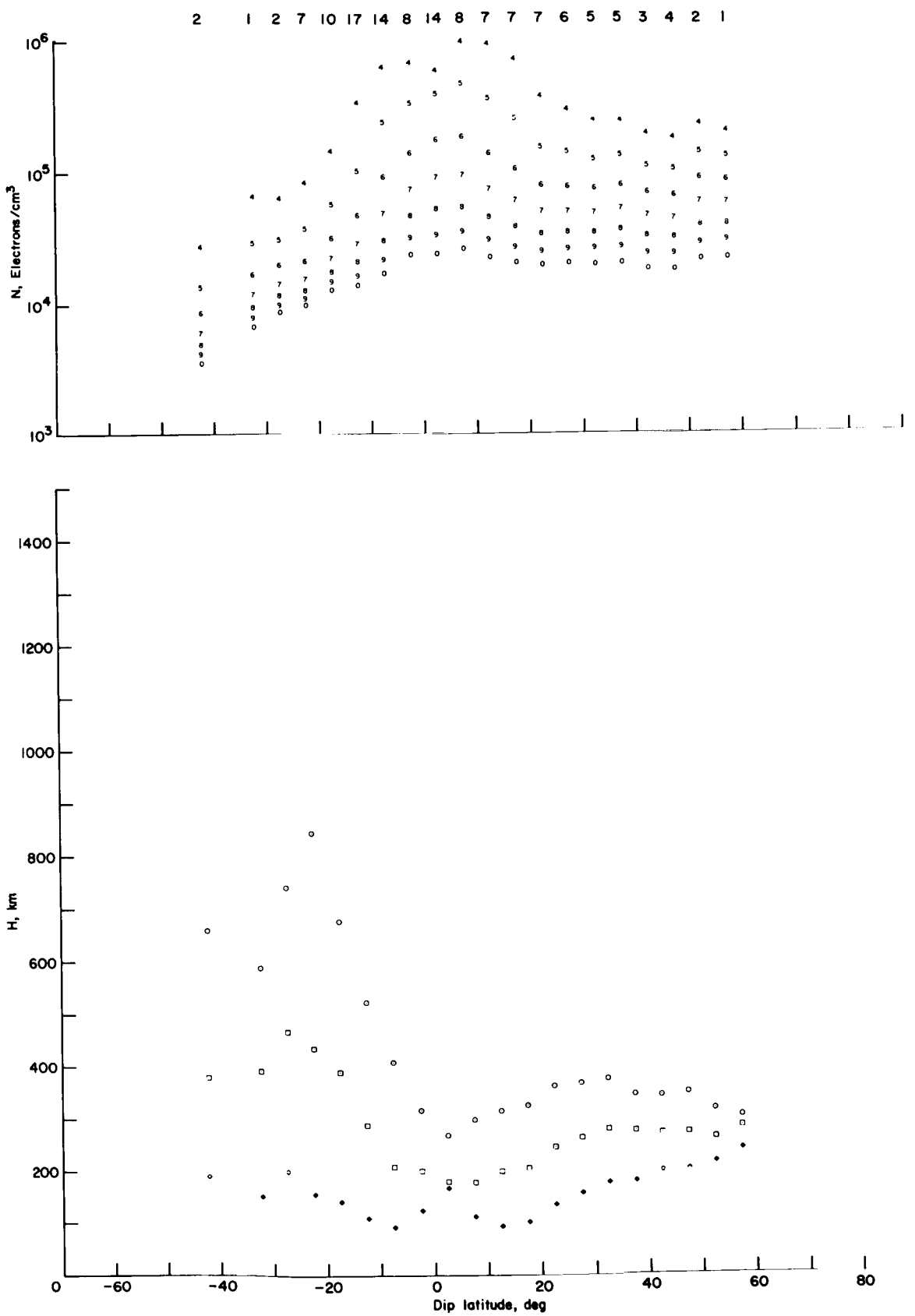

2 1 2 7 10 17 14 8 14 8 7 7 7 6 5 5 3 4 2 1
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 207

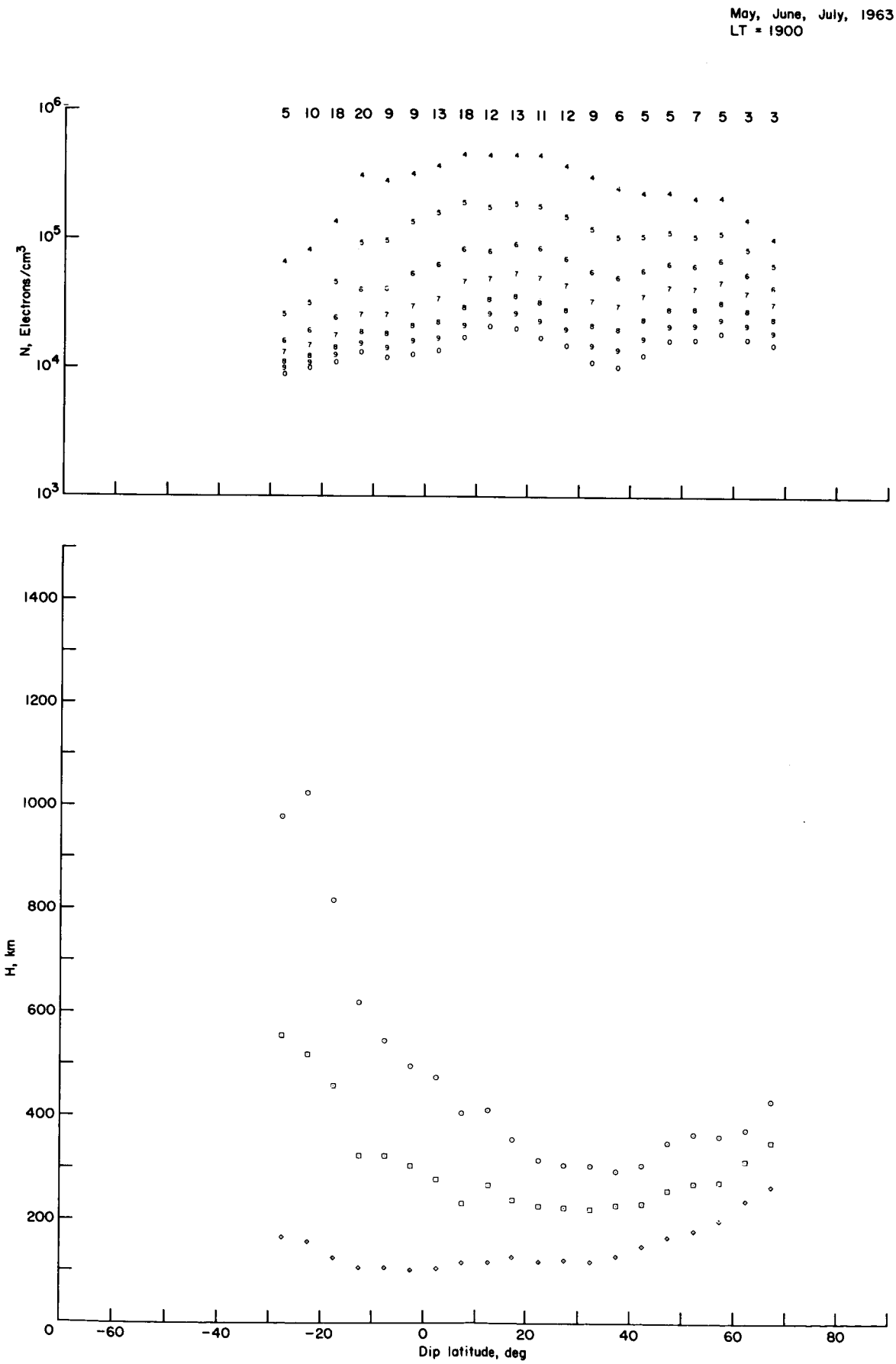

May, June, July, 1963
LT = 1900
5 10 18 20 9 9 13 18 12 13 11 12 9 6 5 5 7 5 3 3
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 208

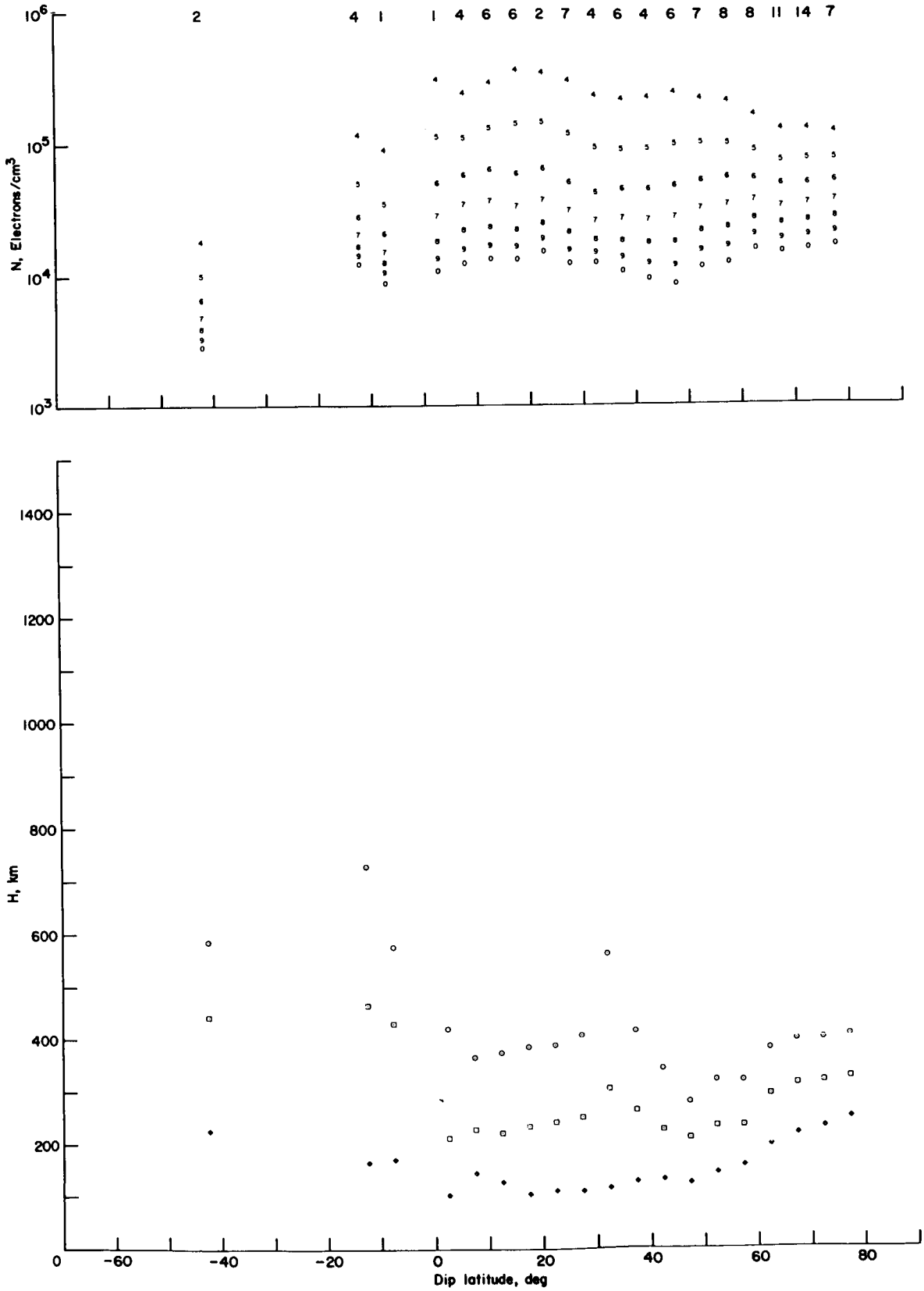

May, June, July, 1963
LT = 2000
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 209

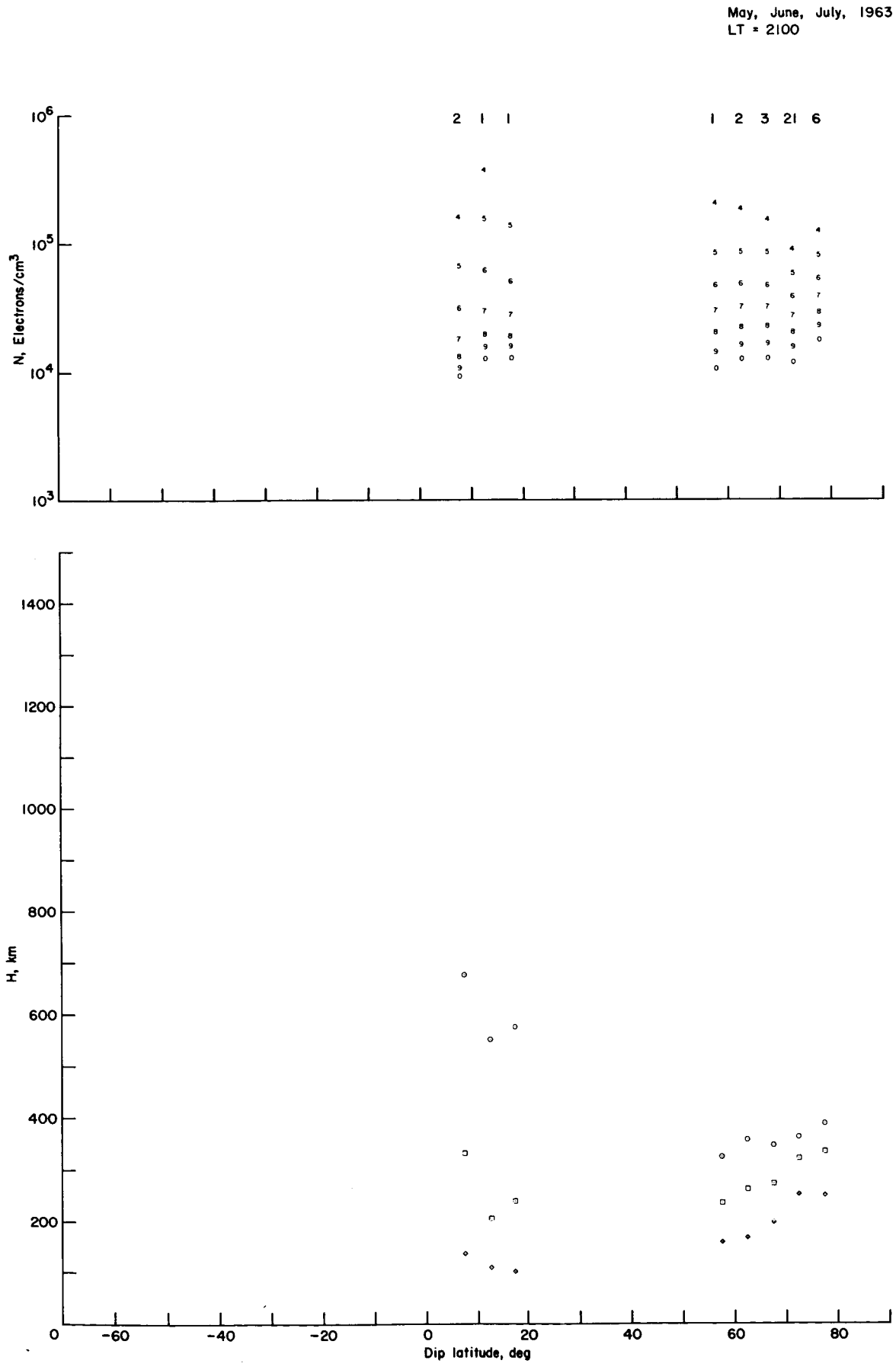

May, June, July, 1963
LT = 2100
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 210

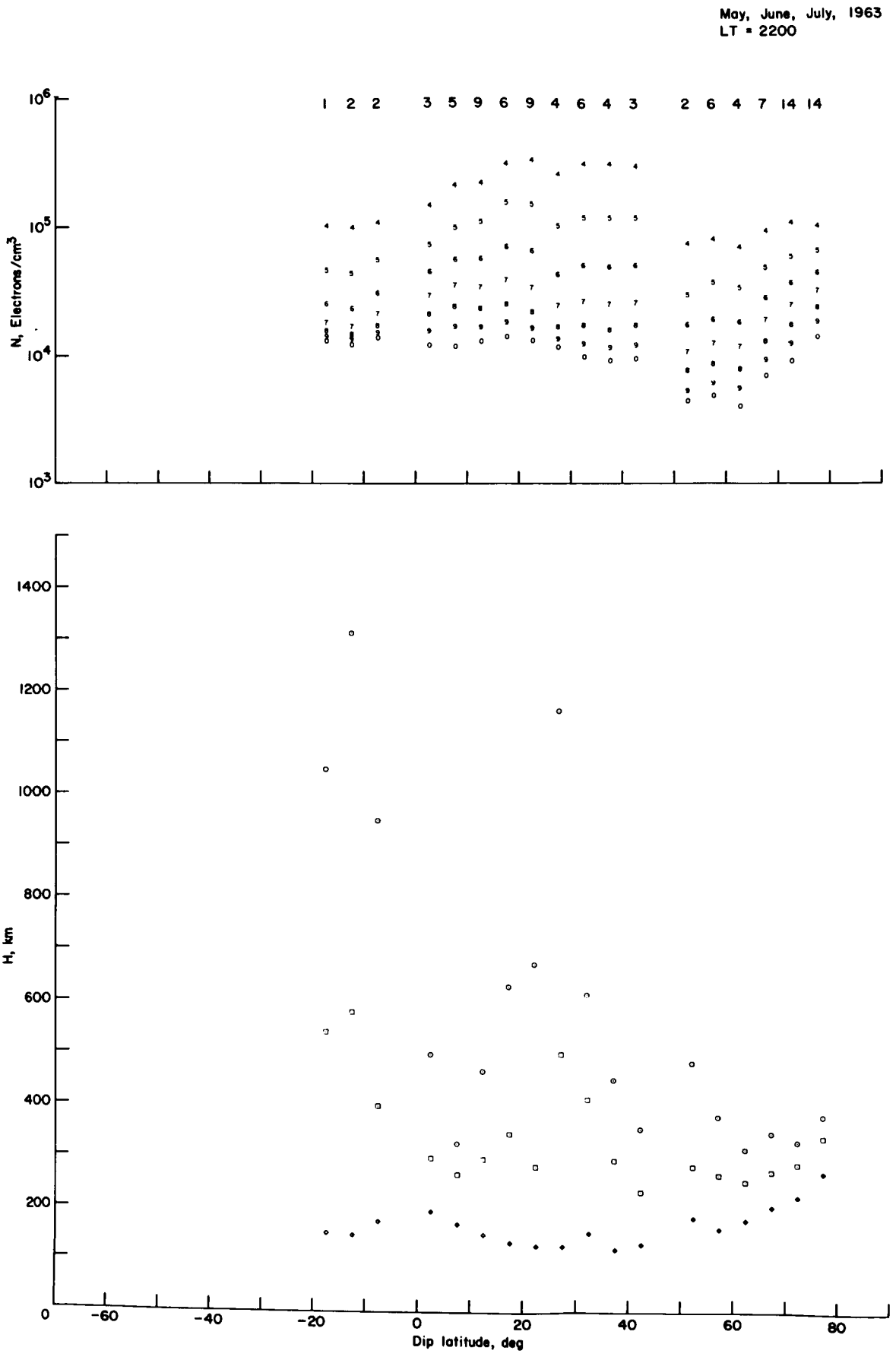

May, June, July, 1963
LT = 2200
1 2 2 3 5 9 6 9 4 6 4 3 2 6 4 7 14 14
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 211

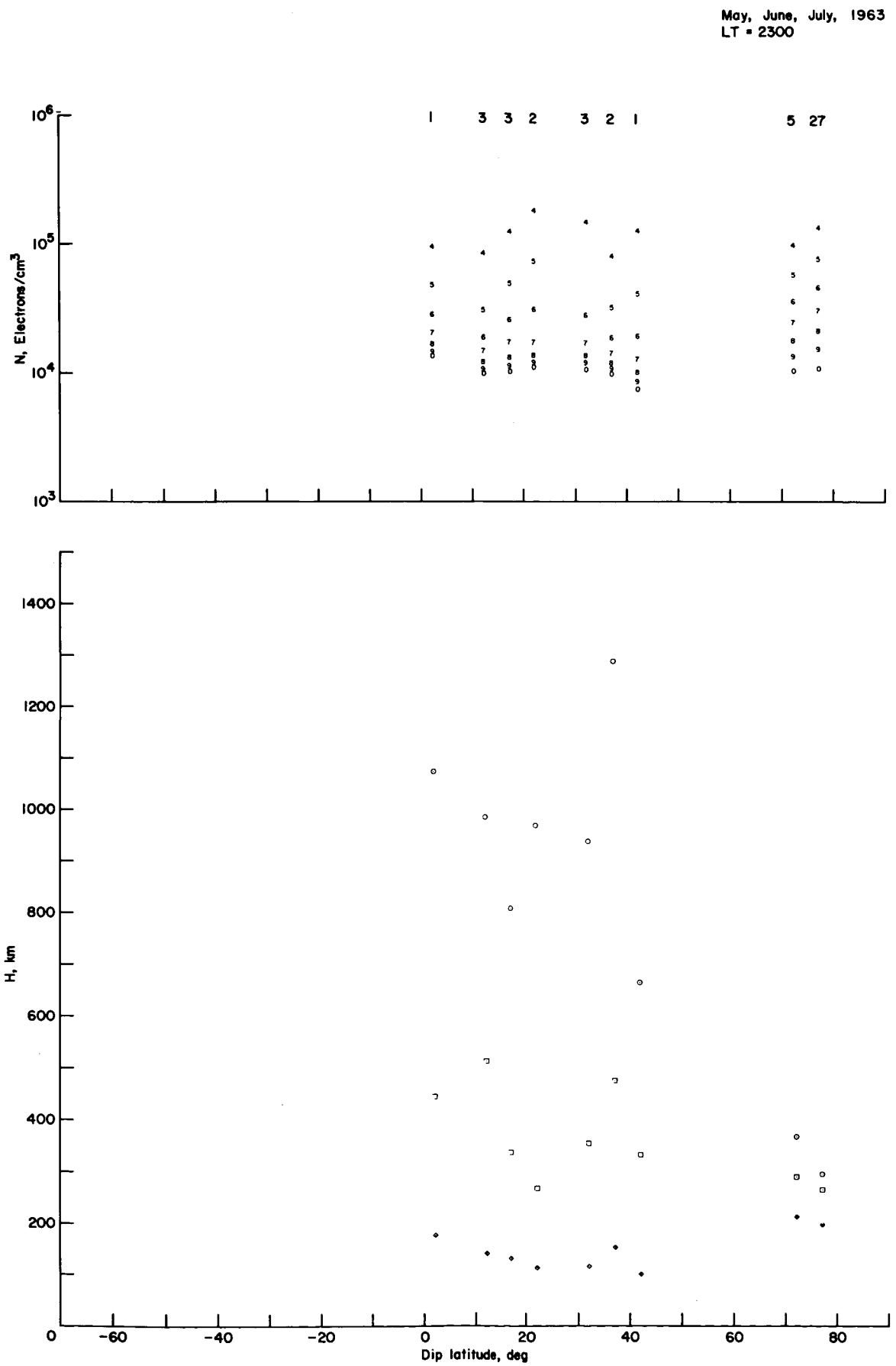

May, June, July, 1963
LT = 2300
N, Electrons/cm3
H, km
Dip latitude, deg

Figure 212

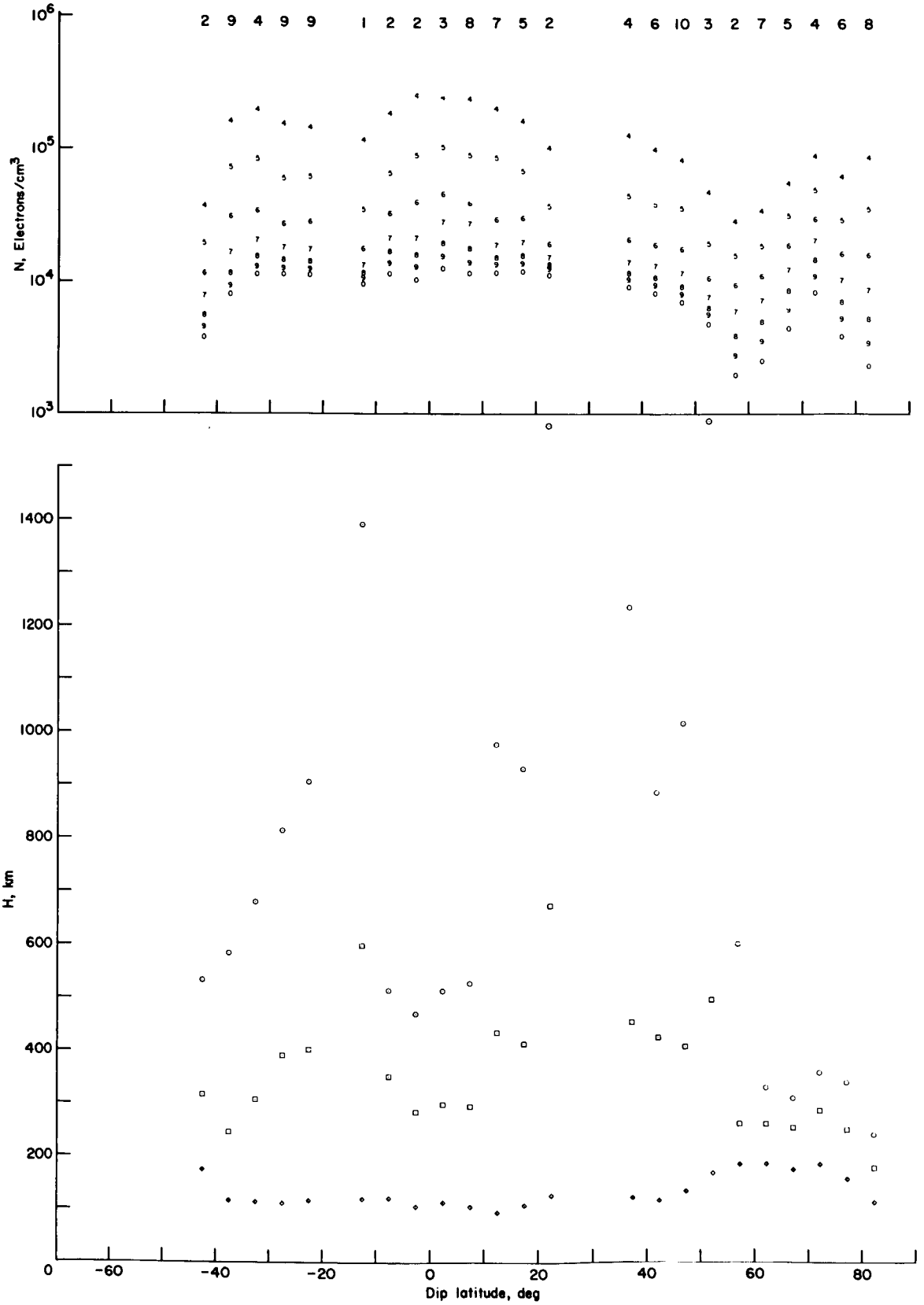

2 9 4 9 9 1 2 2 3 8 7 5 2 4 6 10 3 2 7 5 4 6 8
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 213

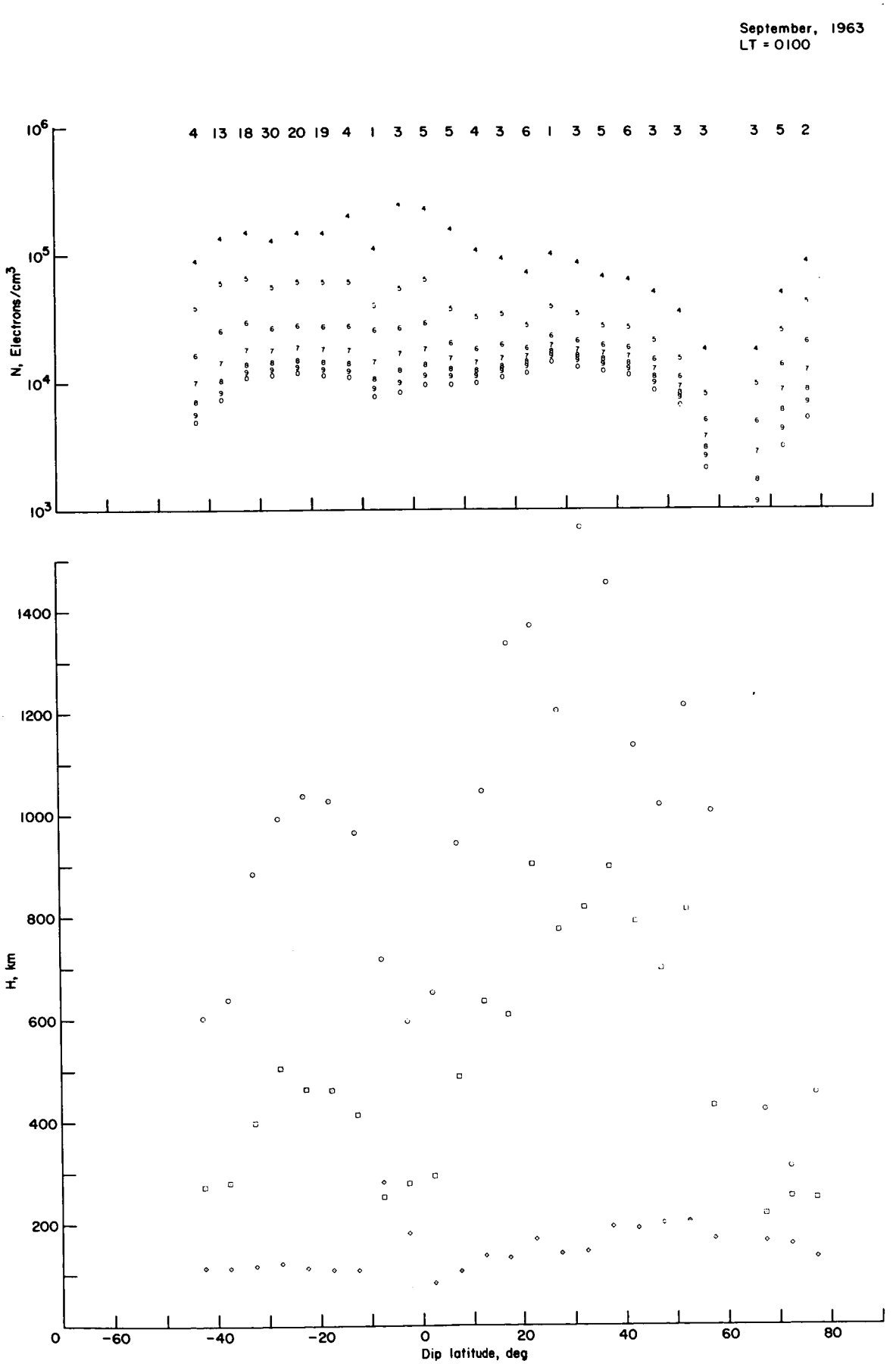

September, 1963
LT = 0100
4 13 18 30 20 19 4 1 3 5 5 4 3 6 1 3 5 6 3 3 3 3 5 2
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 214

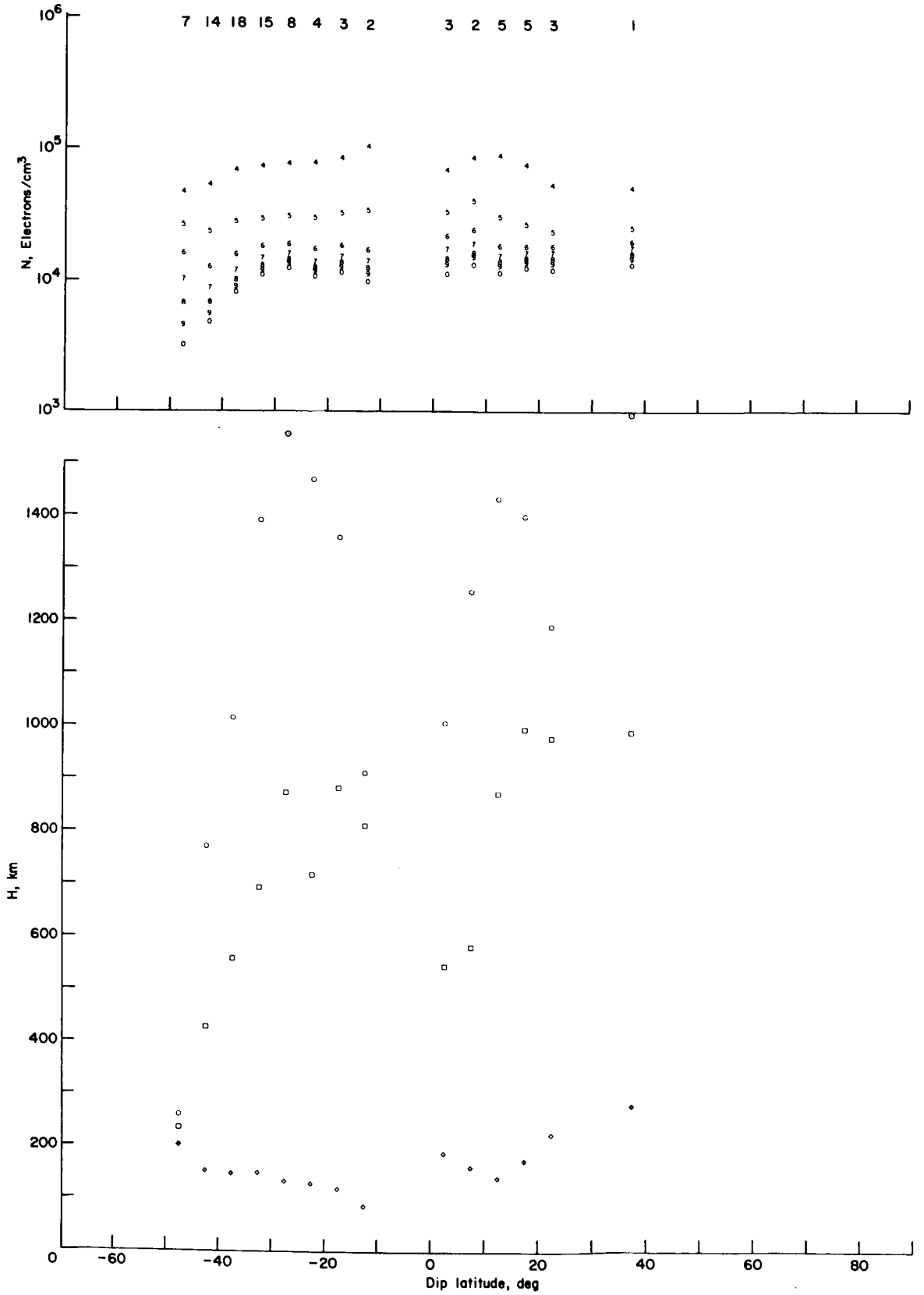

7 14 18 15 8 4 3 2 3 2 5 5 3 1
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 215

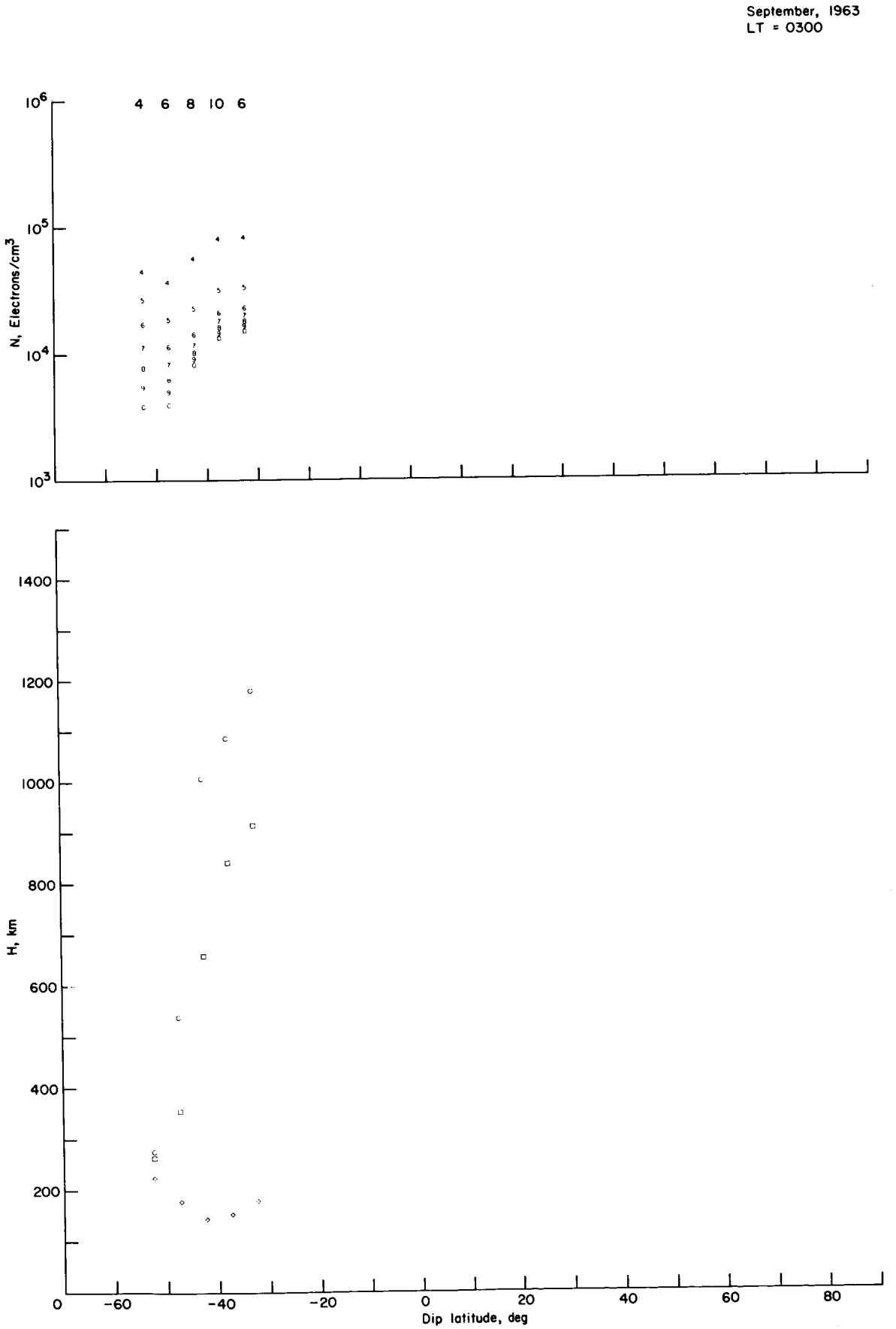


Figure 216

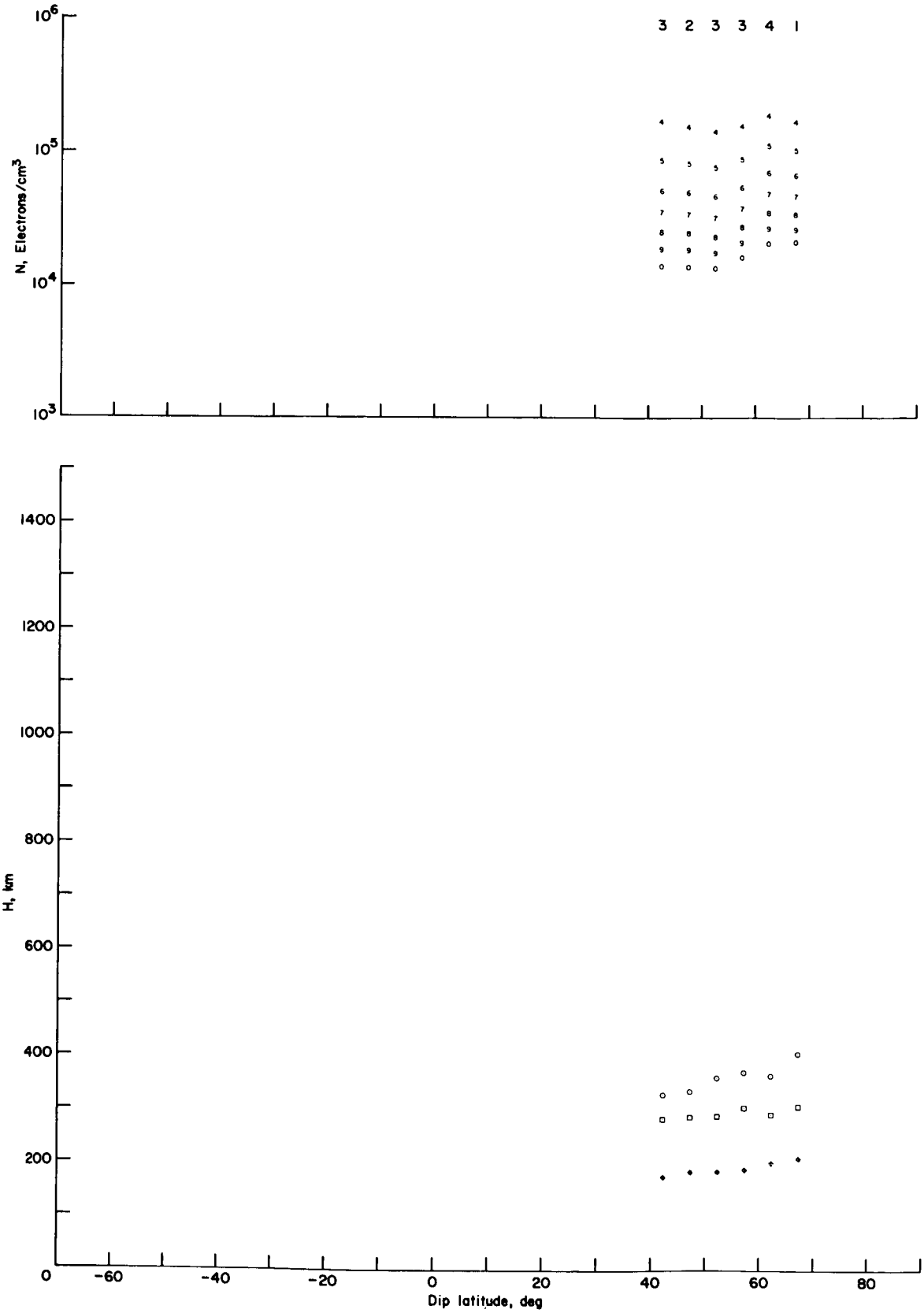

N, Electrons/cm³
10⁶
10⁵
10⁴
10³
3 2 3 3 4 1
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 217

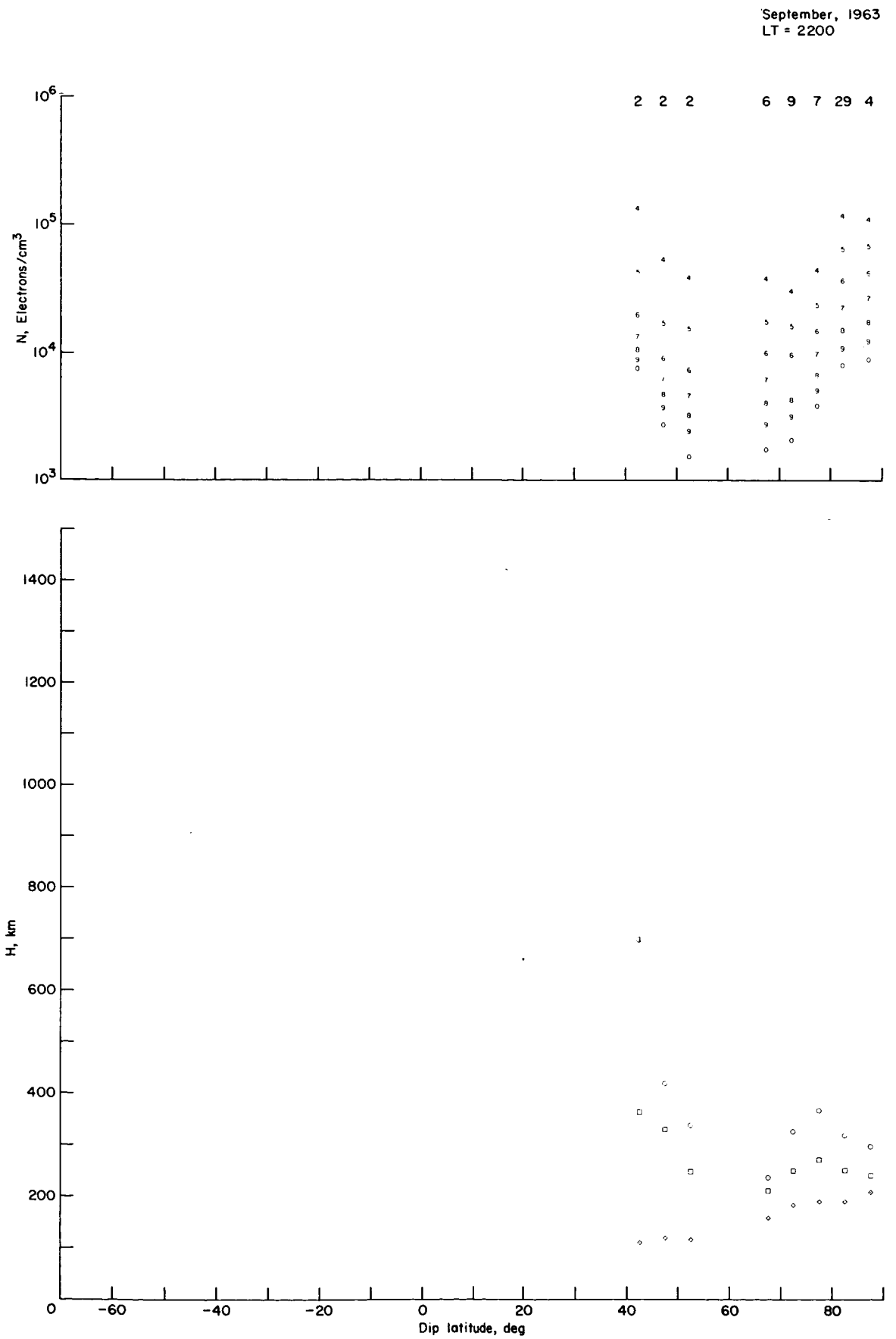

September, 1963
LT = 2200
2 2 2 6 9 7 29 4
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 218

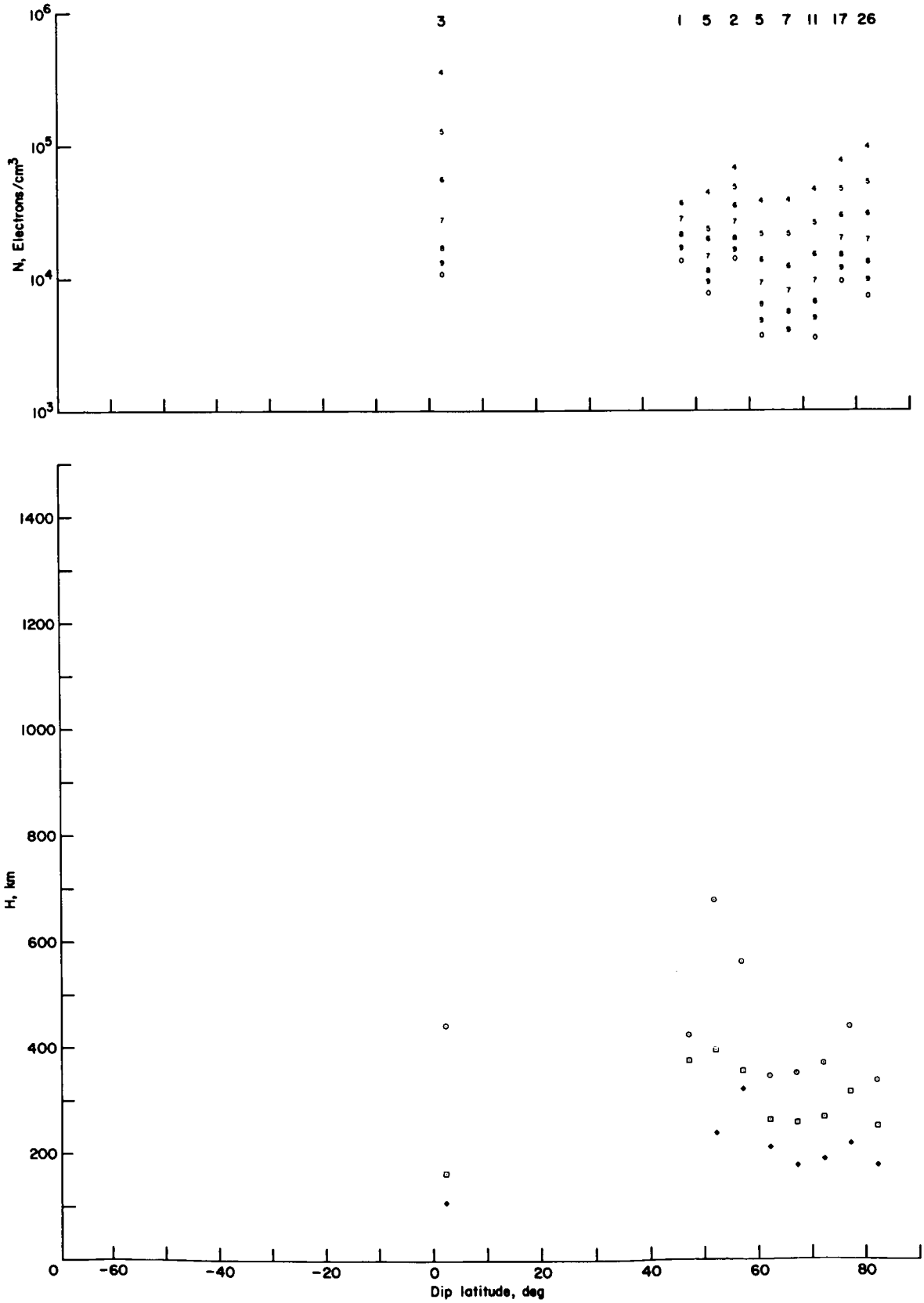

N, Electrons/cm³
10⁶
10⁵
10⁴
10³
3
1 5 2 5 7 11 17 26
H, km
1400
1200
1000
800
600
400
200
0
-60
-40
-20
0
20
40
60
80
Dip latitude, deg

Figure 219

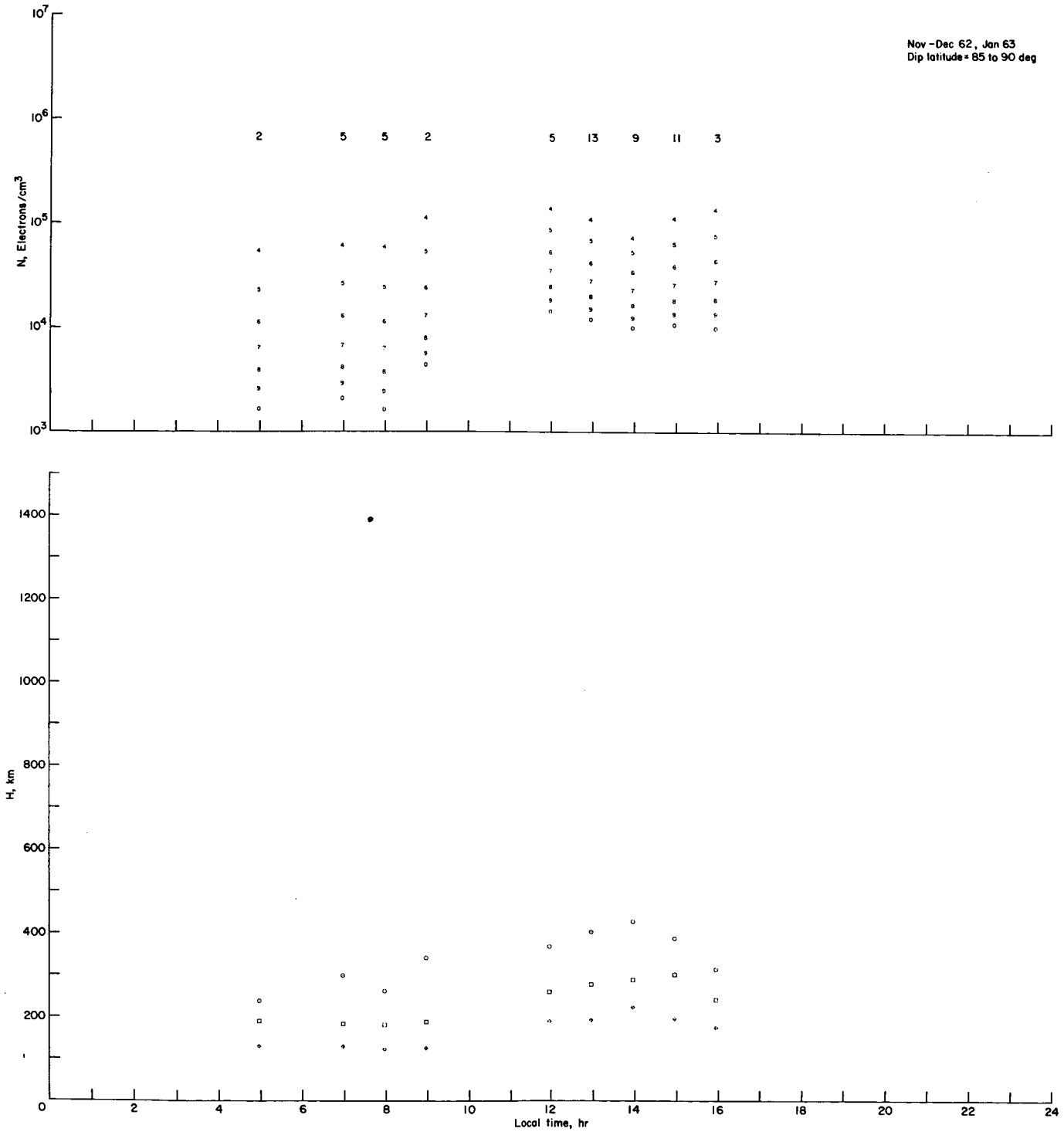

Nov - Dec 62, Jan 63
Dip latitude = 85 to 90 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 220

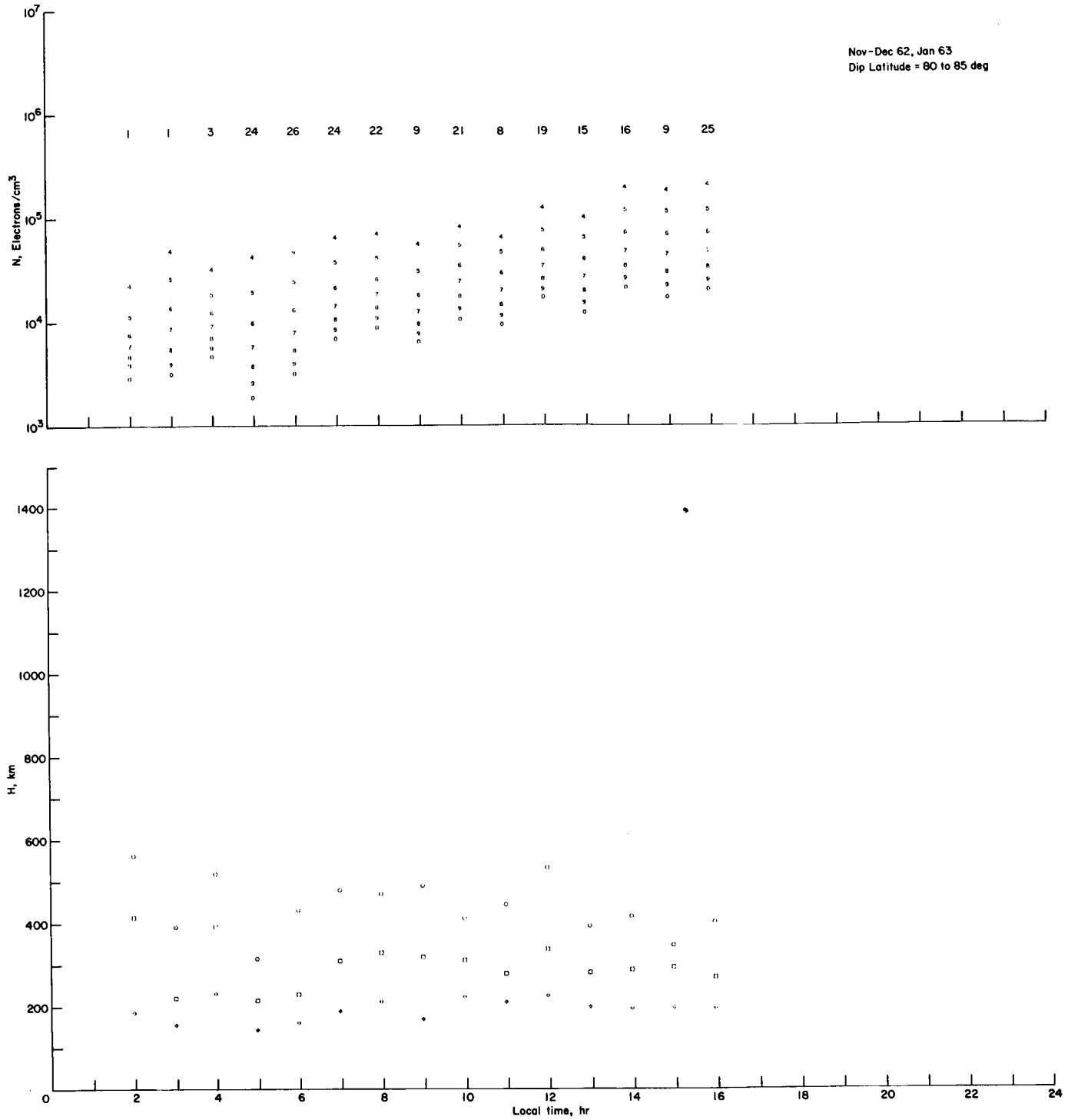

Nov-Dec 62, Jan 63
Dip Latitude = 80 to 85 deg
N, Electrons/cm³
H, km
Local time, hr
1 1 3 24 26 24 22 9 21 8 19 15 16 9 25

Figure 221

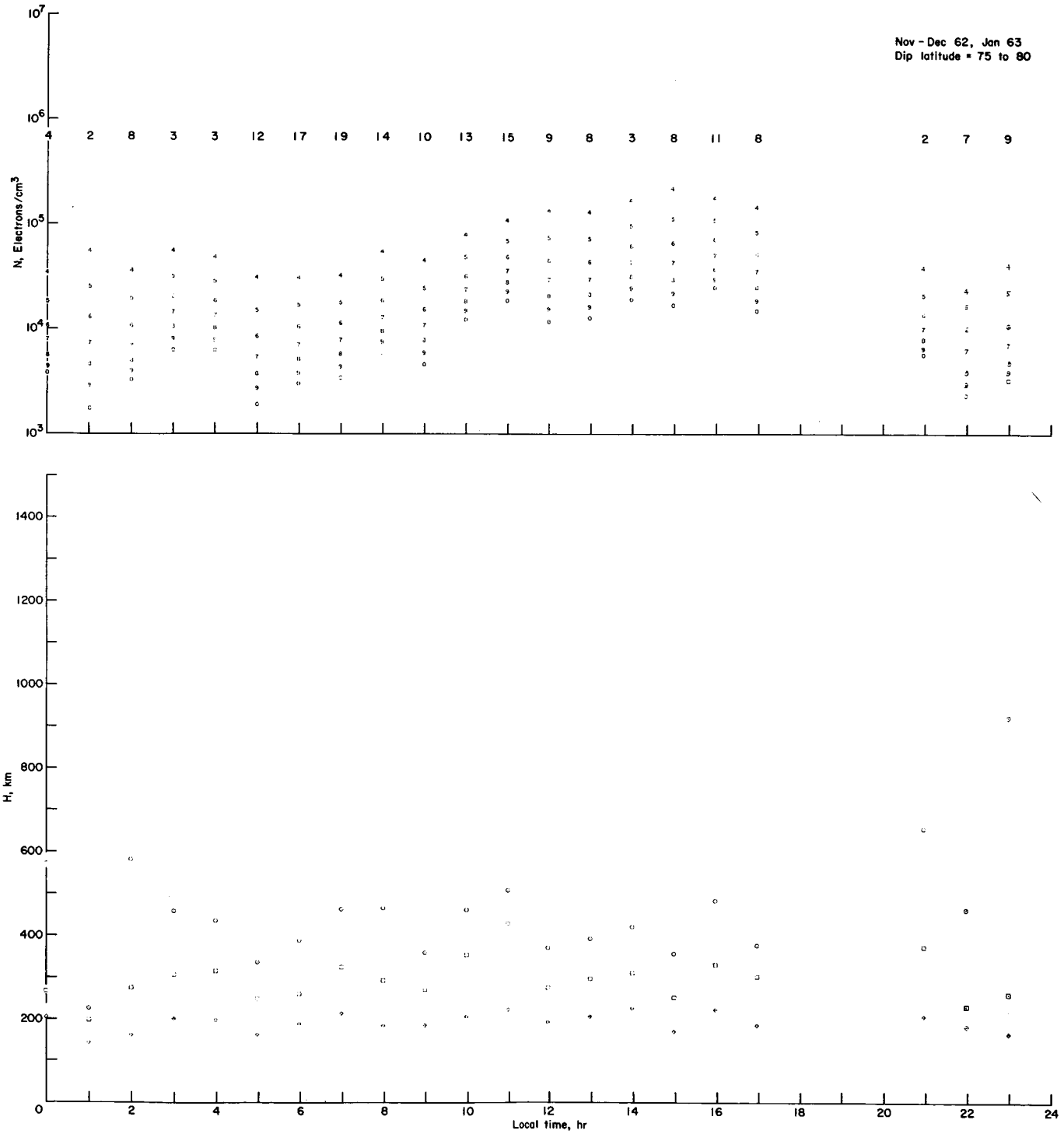

Nov - Dec 62, Jan 63
Dip latitude = 75 to 80
N, Electrons/cm3
H, km
Local time, hr

Figure 222

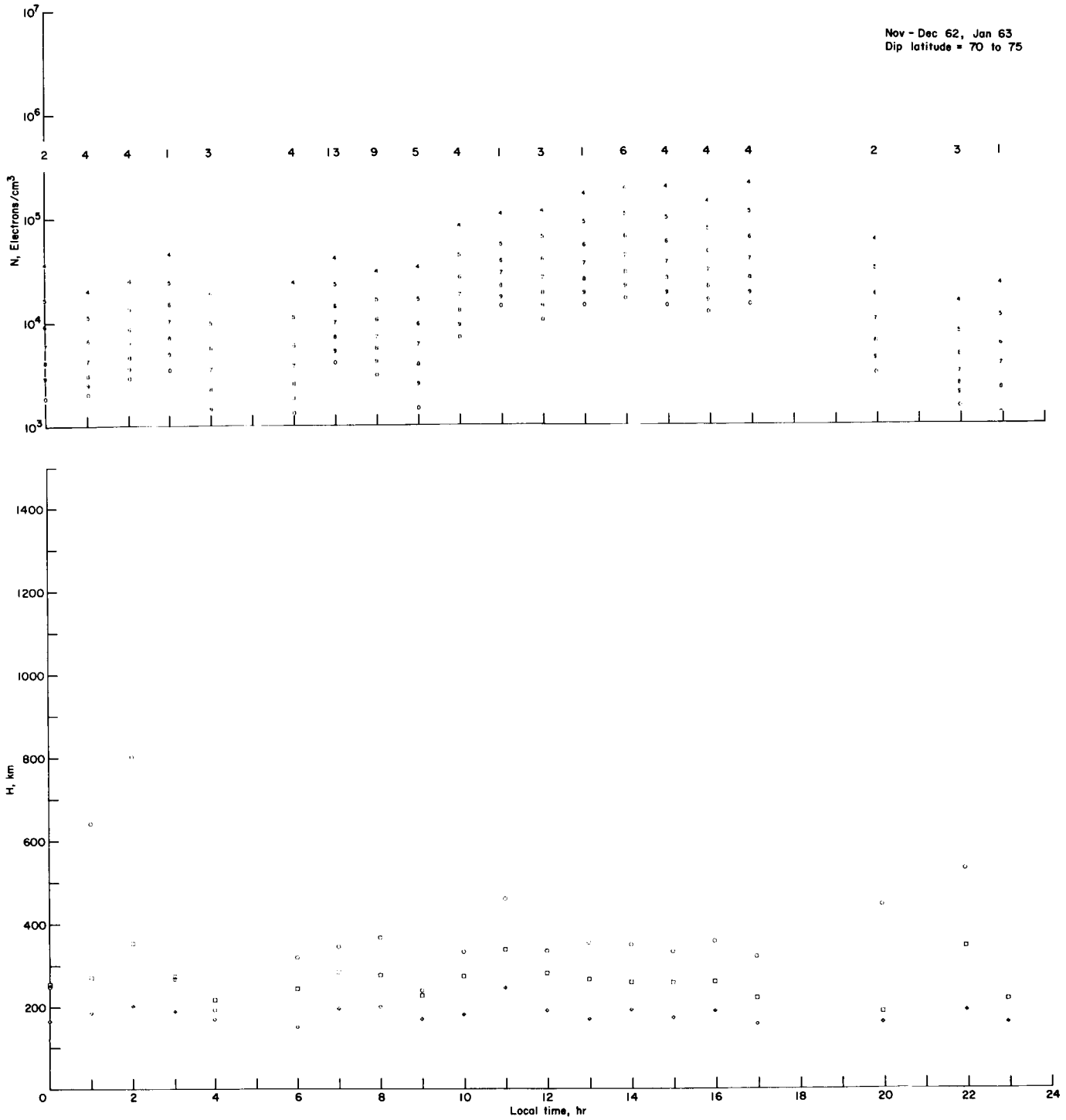

Nov - Dec 62, Jan 63
Dip latitude = 70 to 75
N, Electrons/cm3
H, km
Local time, hr

Figure 223

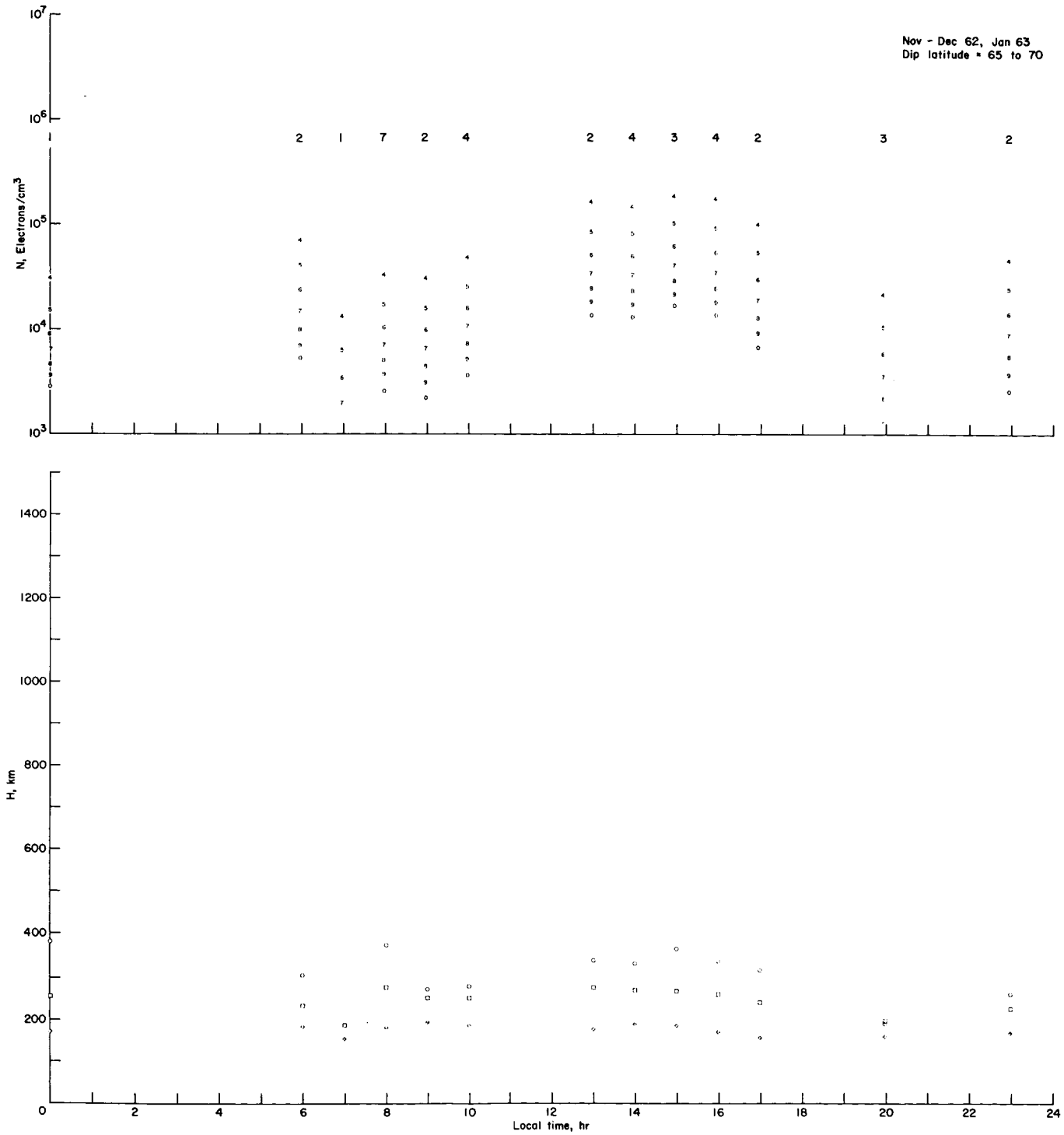

Nov - Dec 62, Jan 63
Dip latitude = 65 to 70
N, Electrons/cm3
H, km
Local time, hr

Figure 224

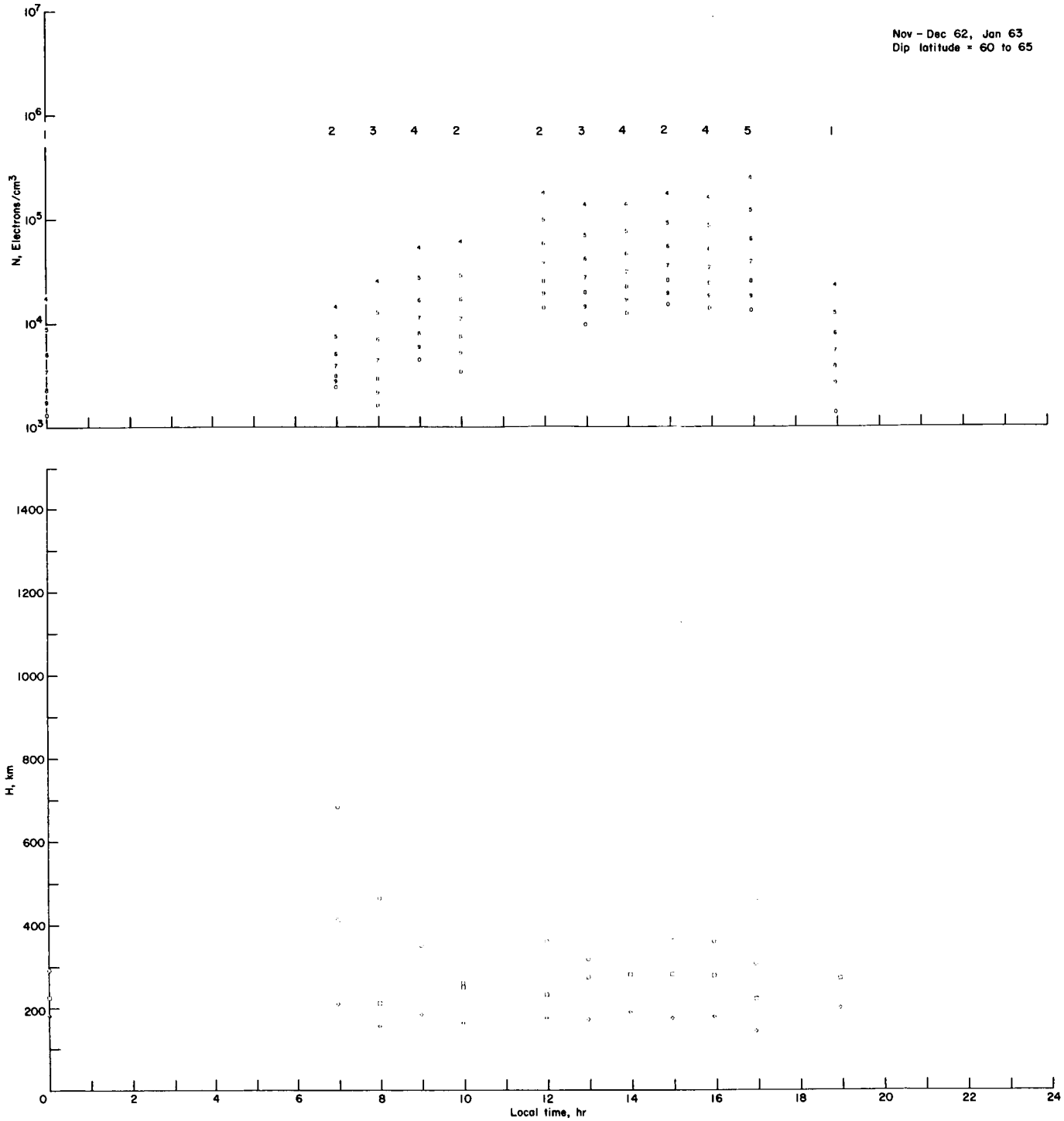

Nov - Dec 62, Jan 63
Dip latitude = 60 to 65
N, Electrons/cm3
H, km
Local time, hr

Figure 225

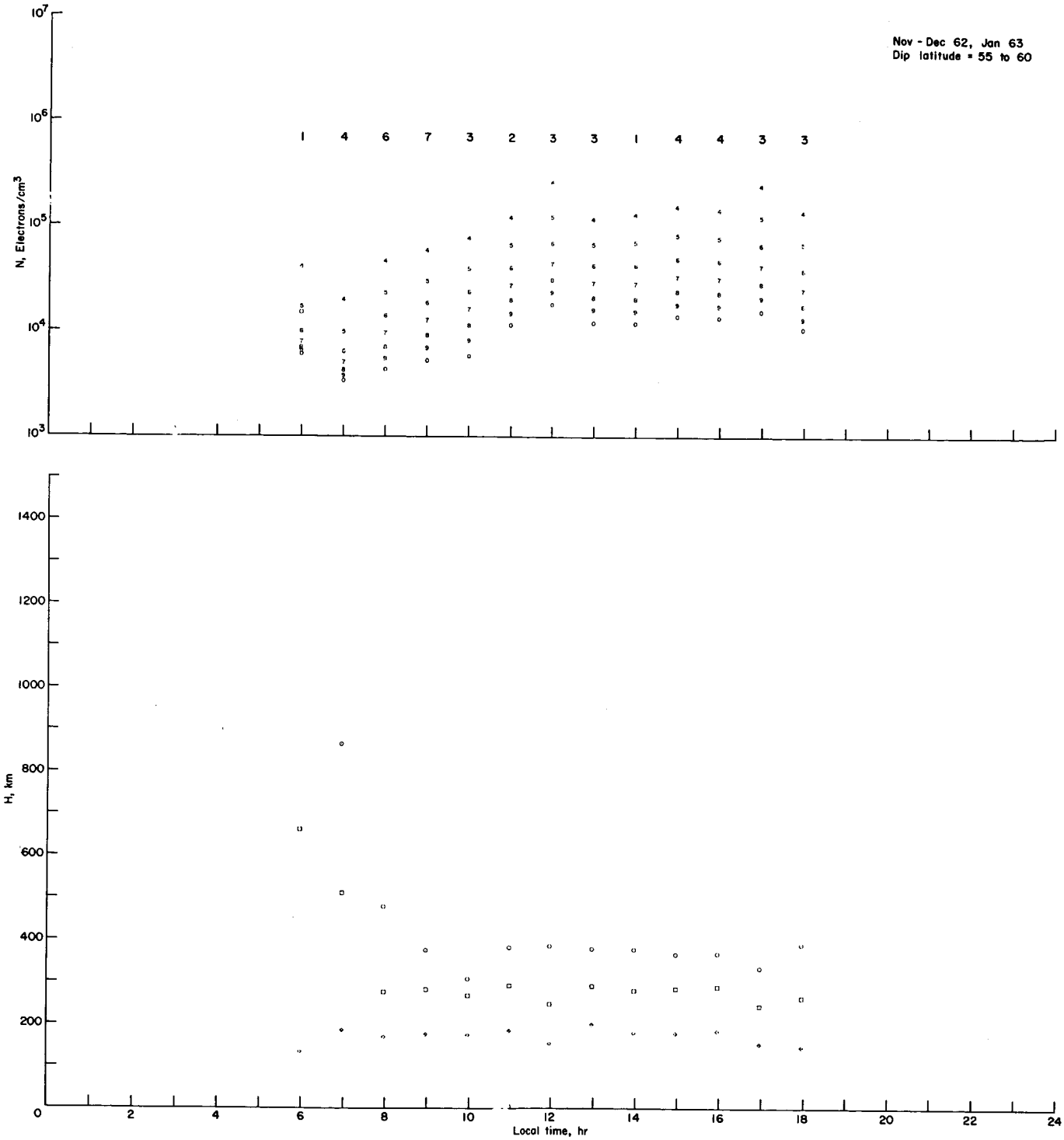

Nov - Dec 62, Jan 63
Dip latitude = 55 to 60
N, Electrons/cm3
H, km
Local time, hr

Figure 226

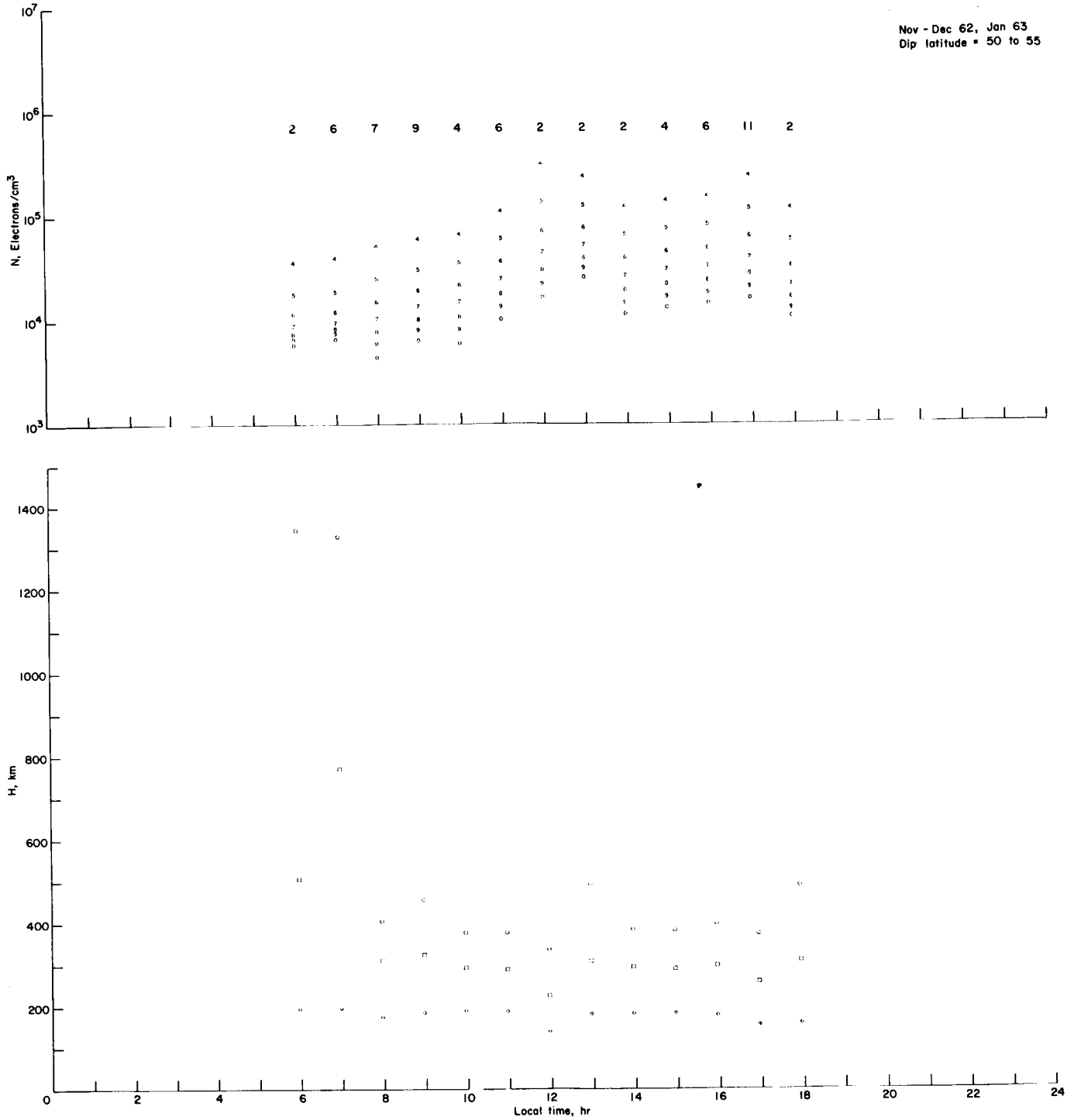

Nov - Dec 62, Jan 63
Dip latitude = 50 to 55
2 6 7 9 4 6 2 2 2 4 6 11 2
N, Electrons/cm3
10^7
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 227

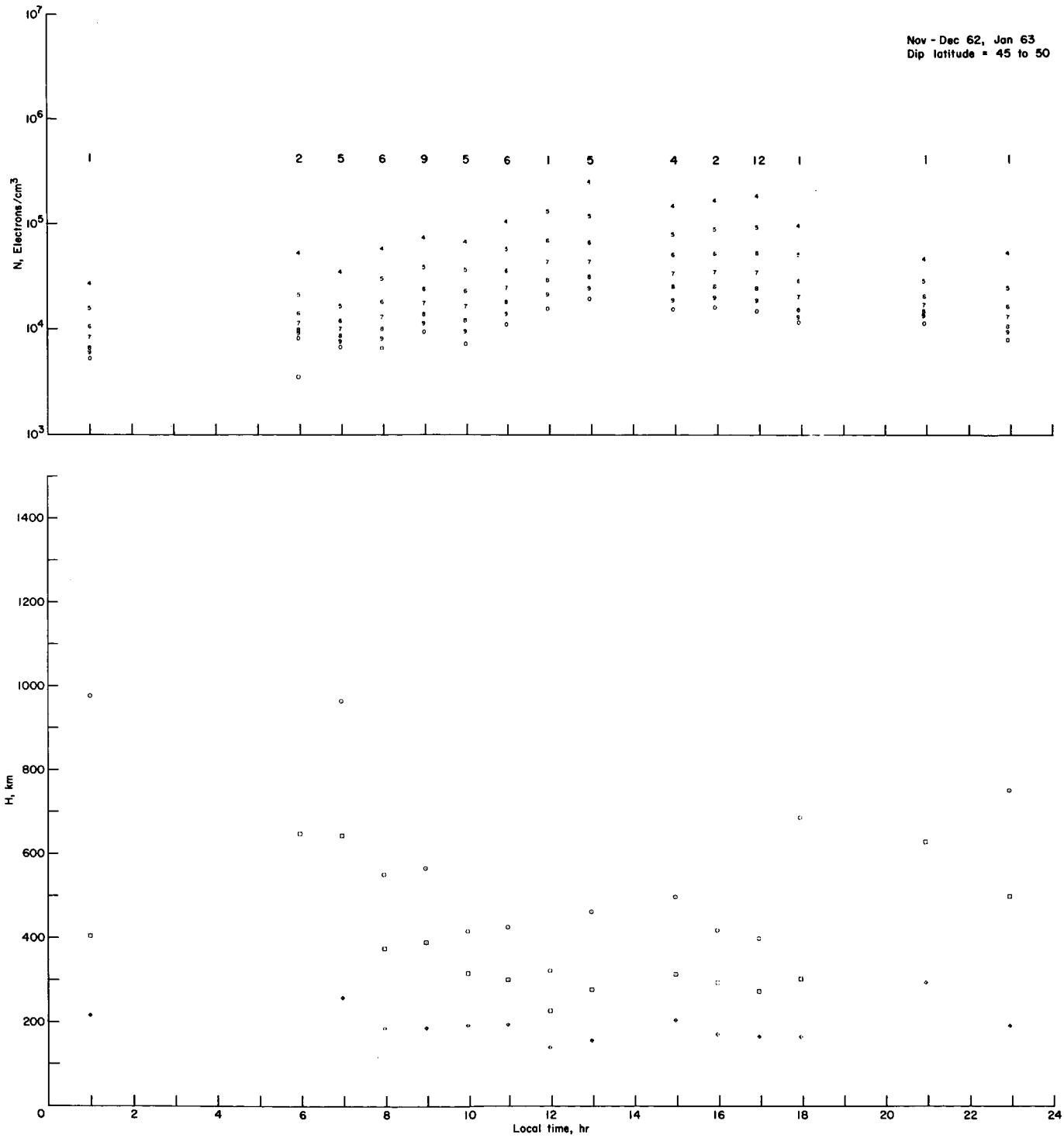

Nov - Dec 62, Jan 63
Dip latitude = 45 to 50
N, Electrons/cm³
H, km
Local time, hr

Figure 228

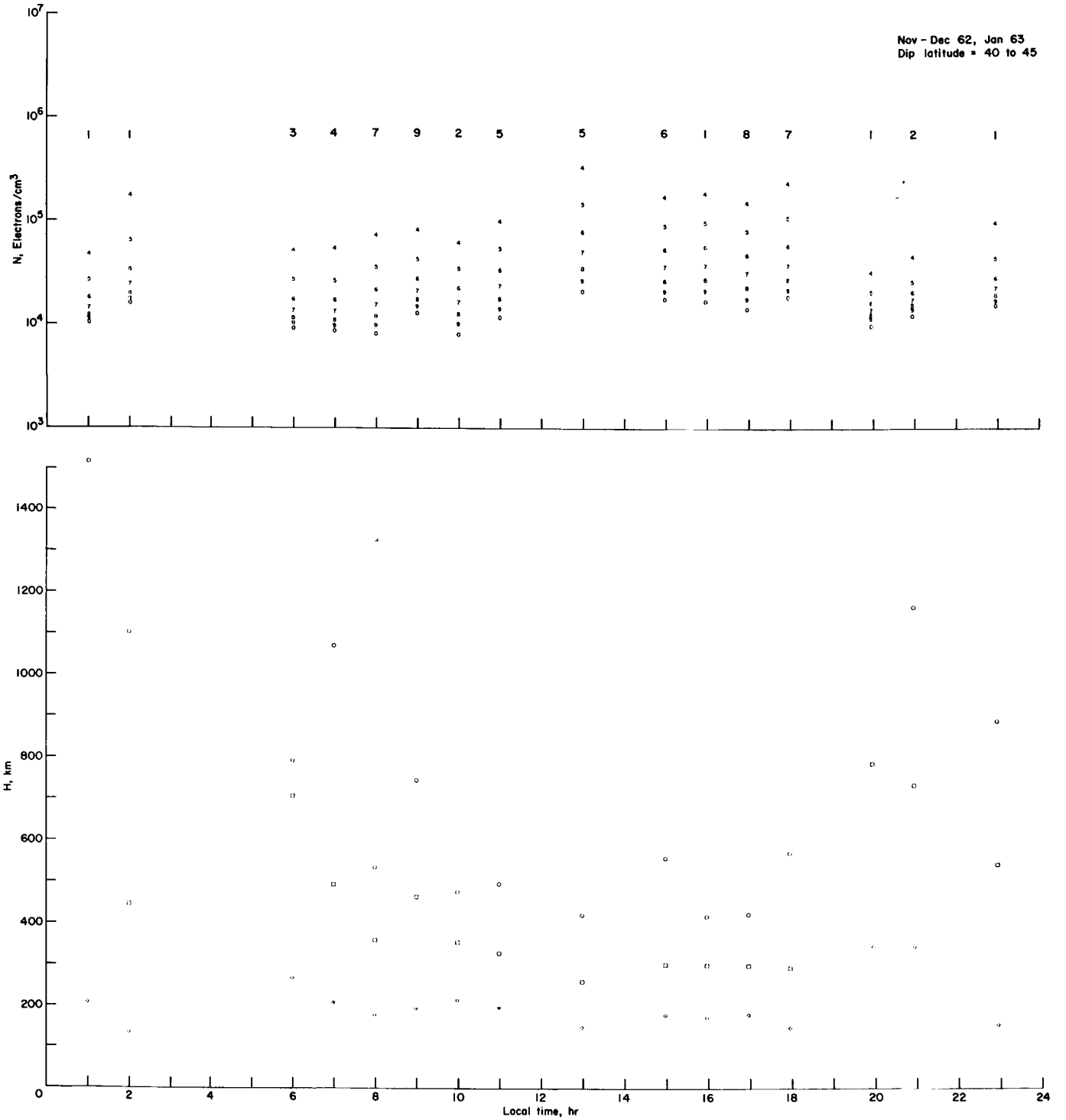

Nov - Dec 62, Jan 63
Dip latitude = 40 to 45
N, Electrons/cm3
H, km
Local time, hr

Figure 229

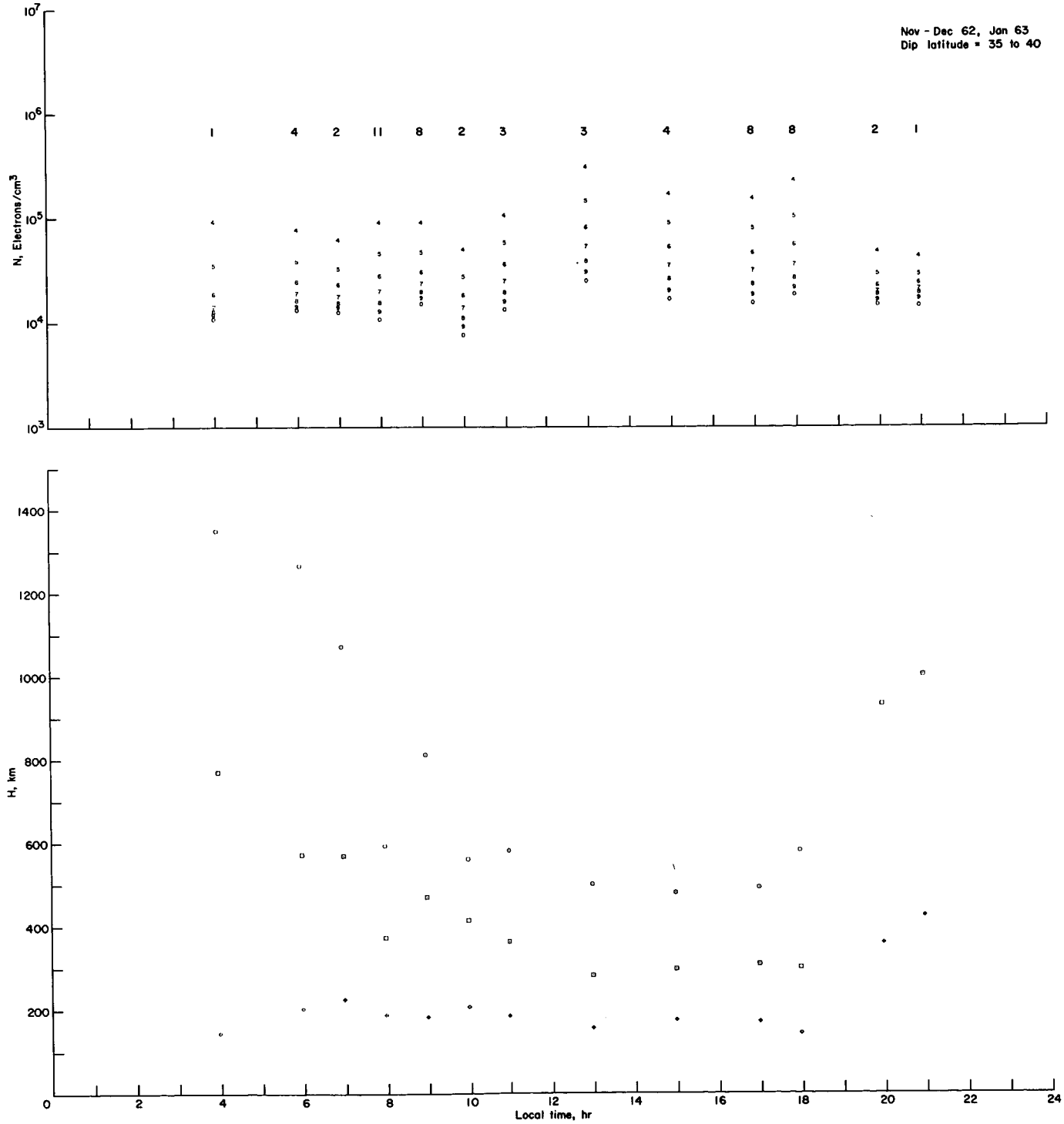

Nov - Dec 62, Jan 63
Dip latitude = 35 to 40
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
1 4 2 11 8 2 3 3 4 8 8 2 1
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 230

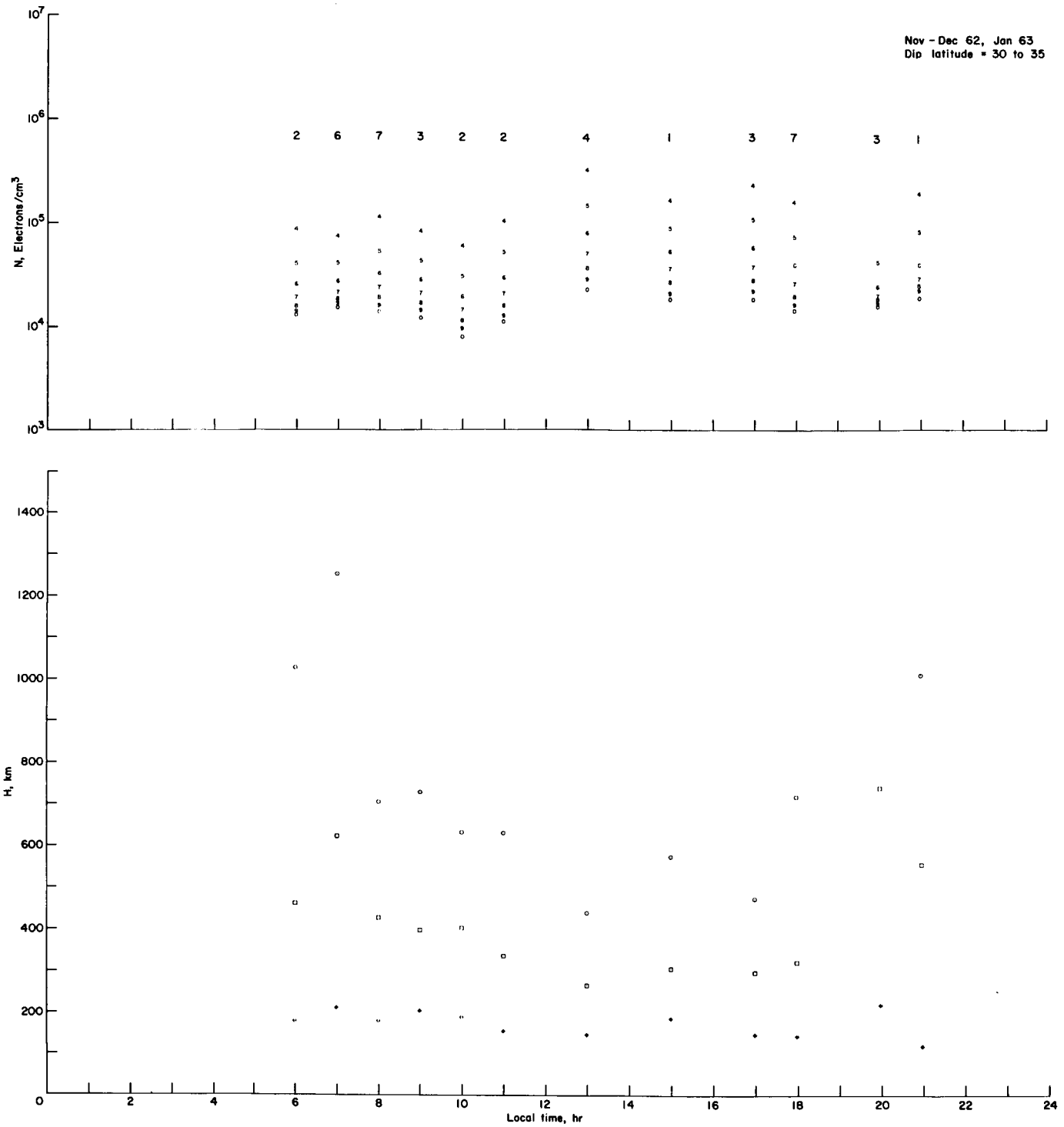

Nov - Dec 62, Jan 63
Dip latitude = 30 to 35
N, Electrons/cm3
H, km
Local time, hr

Figure 231

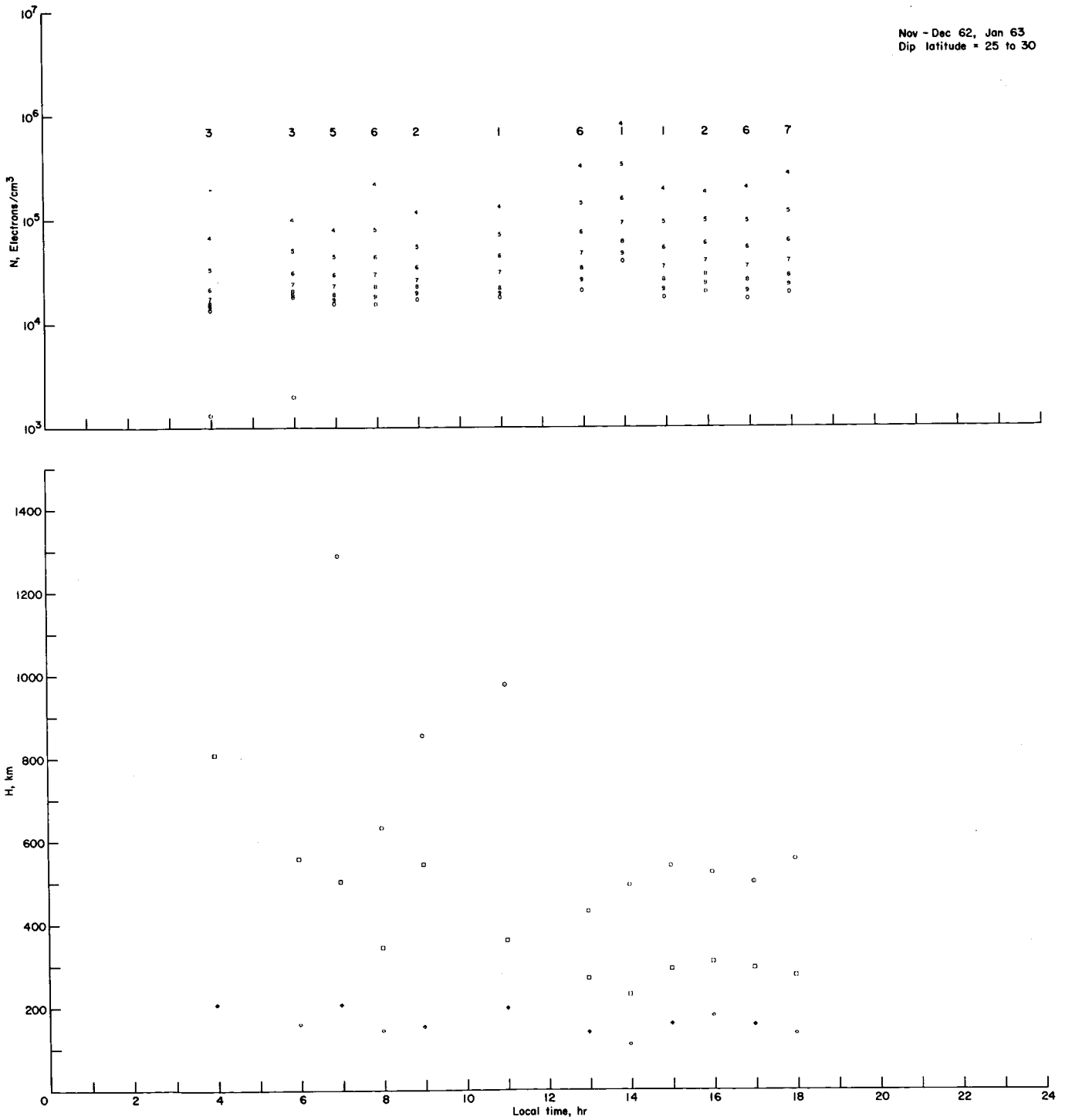

Nov - Dec 62, Jan 63
Dip latitude = 25 to 30
N, Electrons/cm³
H, km
Local time, hr

Figure 232

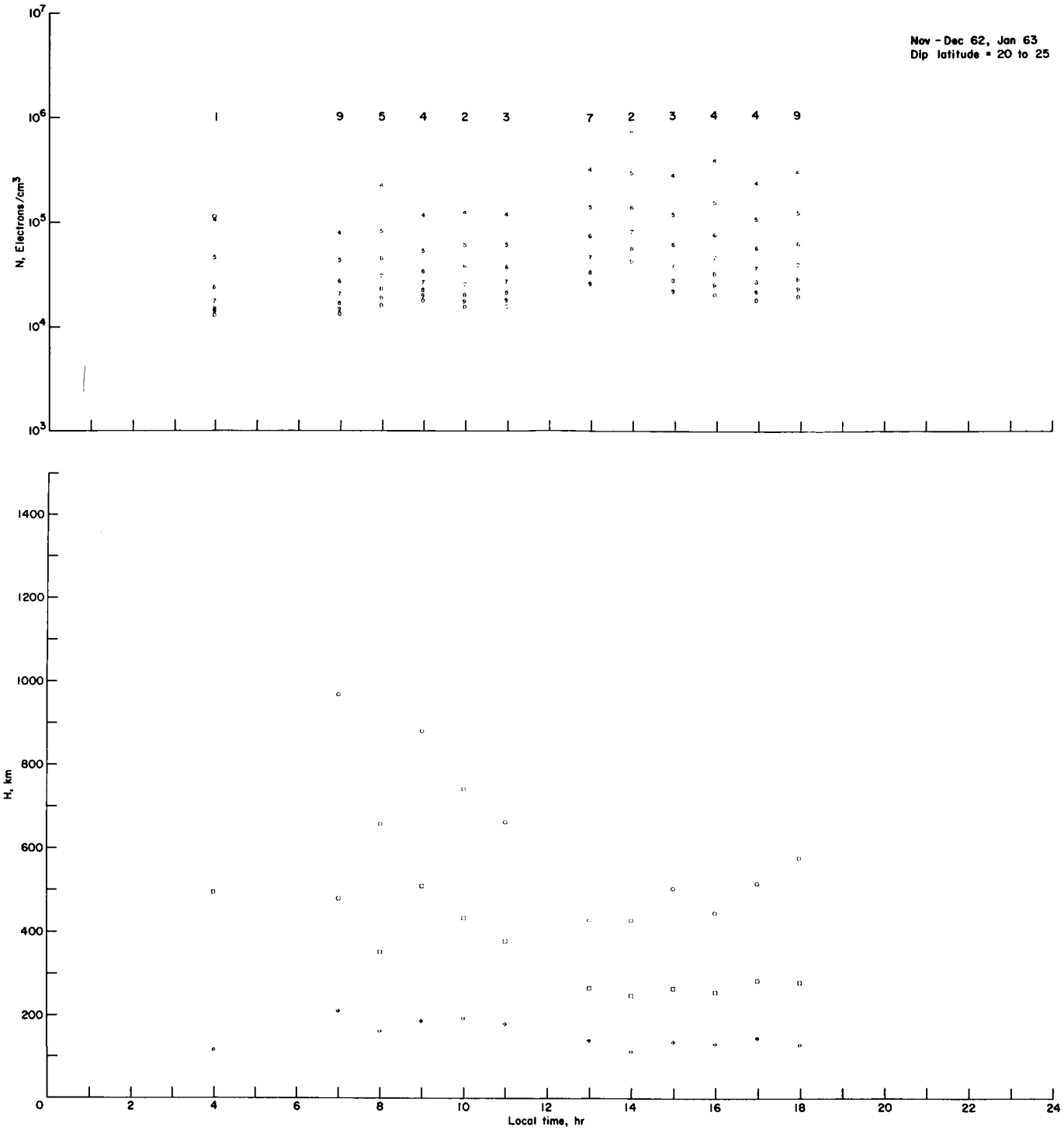

Nov - Dec 62, Jan 63
Dip latitude = 20 to 25
N, Electrons/cm³
H, km
Local time, hr

Figure 233

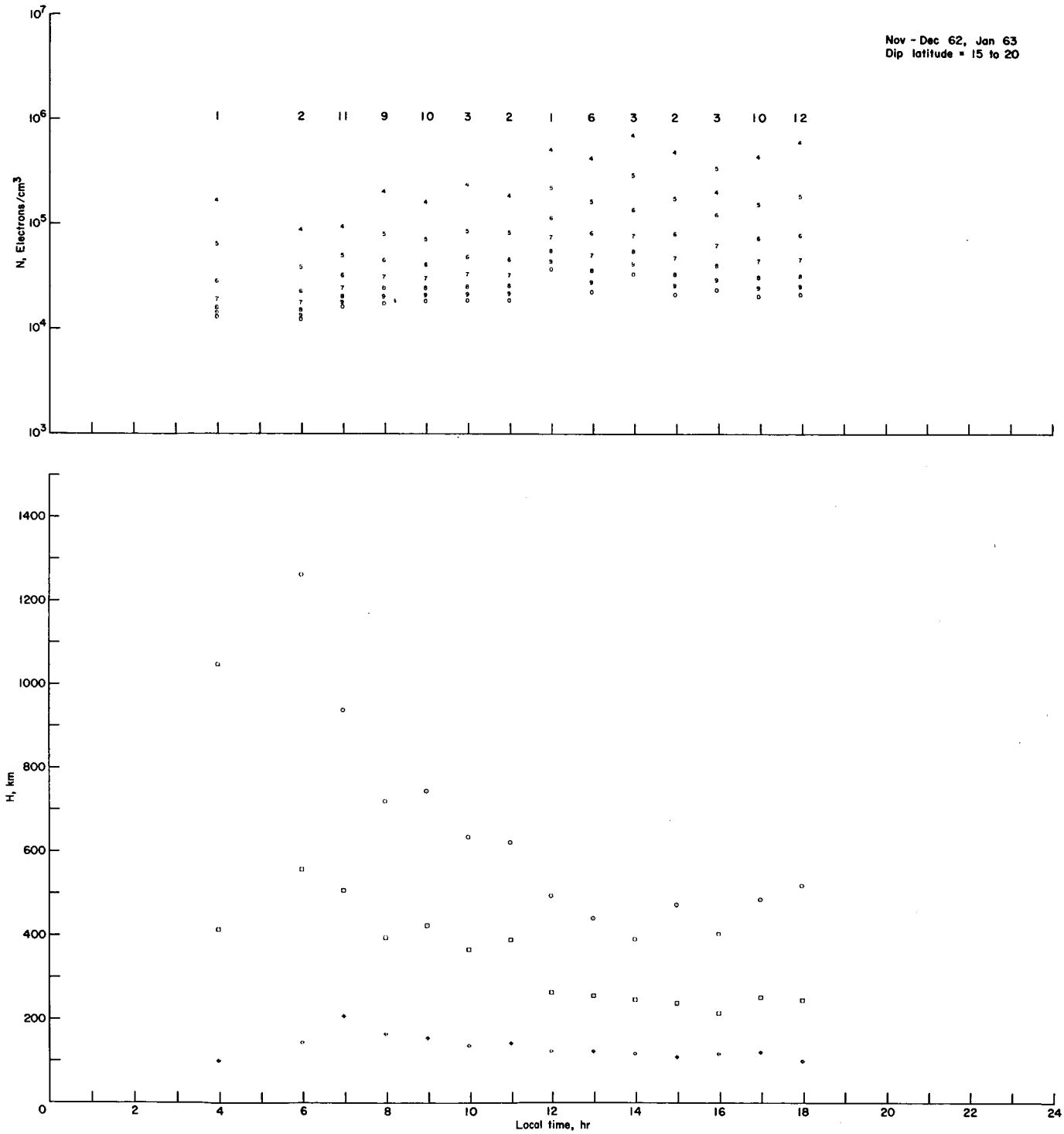

Nov - Dec 62, Jan 63
Dip latitude = 15 to 20
N, Electrons/cm3
H, km
Local time, hr

Figure 234

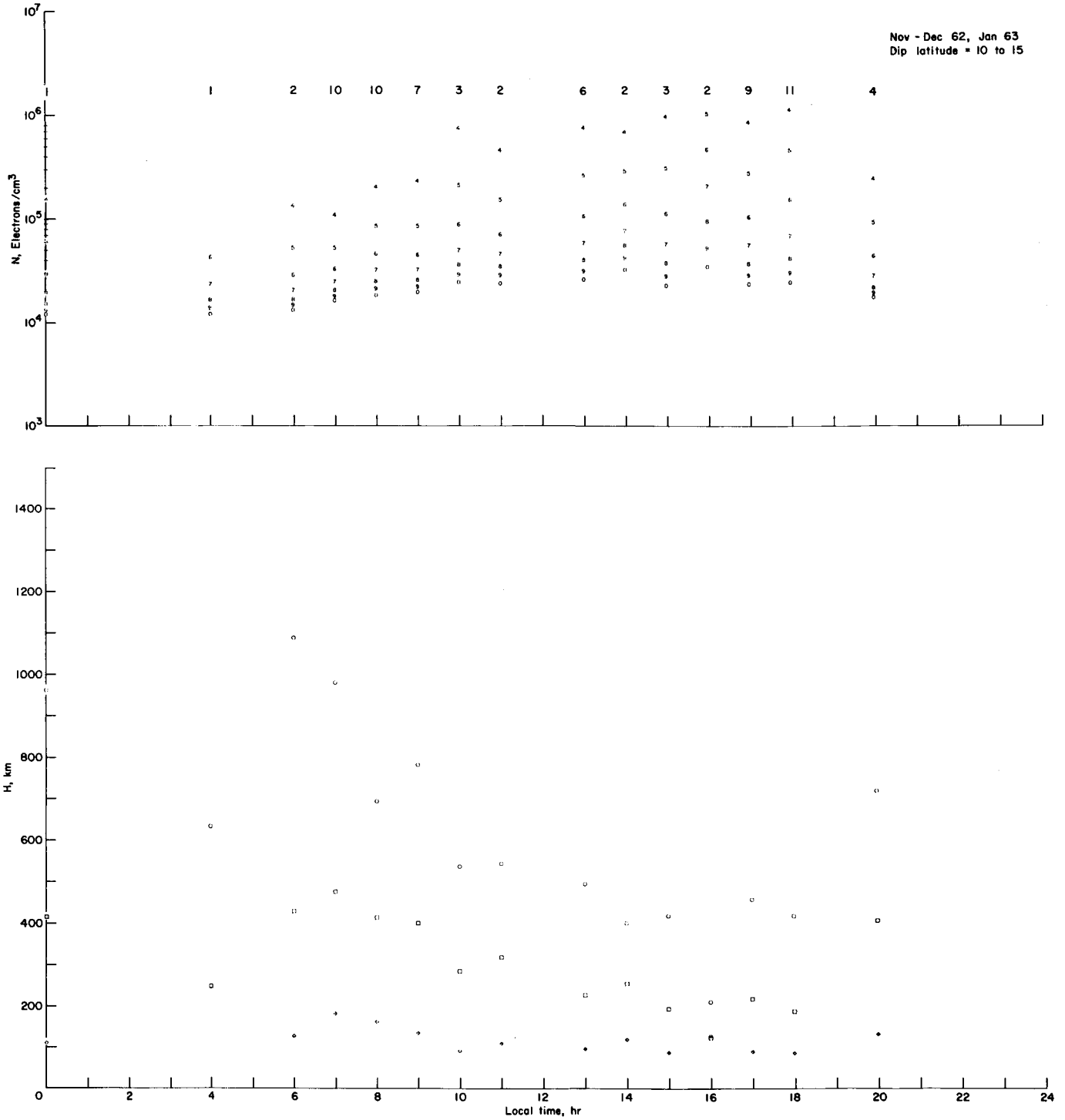

Nov - Dec 62, Jan 63
Dip latitude = 10 to 15
1 2 10 10 7 3 2 6 2 3 2 9 11 4
N, Electrons/cm3
H, km
Local time, hr

Figure 235

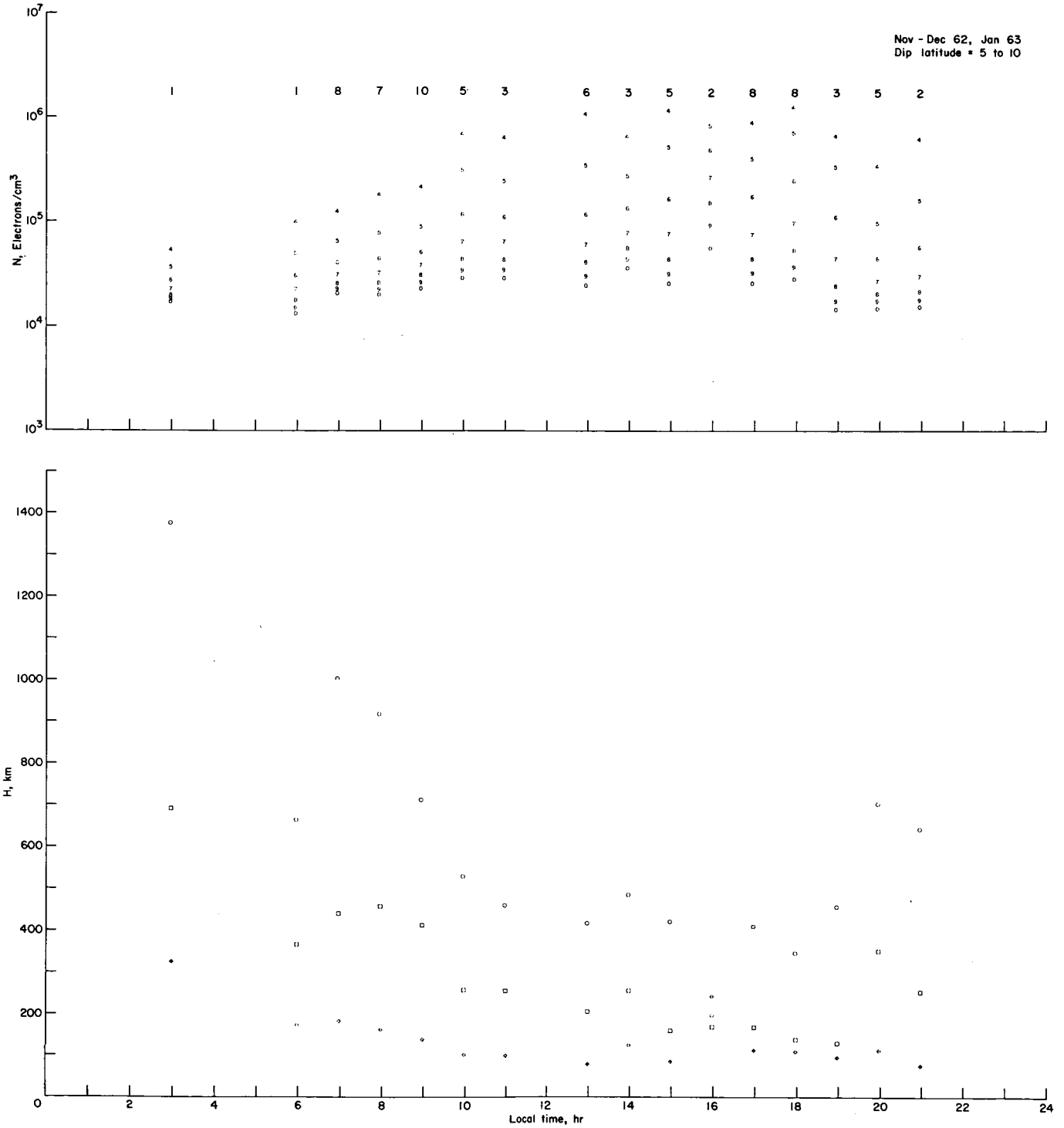

Nov - Dec 62, Jan 63
Dip latitude = 5 to 10
N_e Electrons/cm^3
10^7
10^6
10^5
10^4
10^3
1 1 8 7 10 5 3 6 3 5 2 8 8 3 5 2
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 236

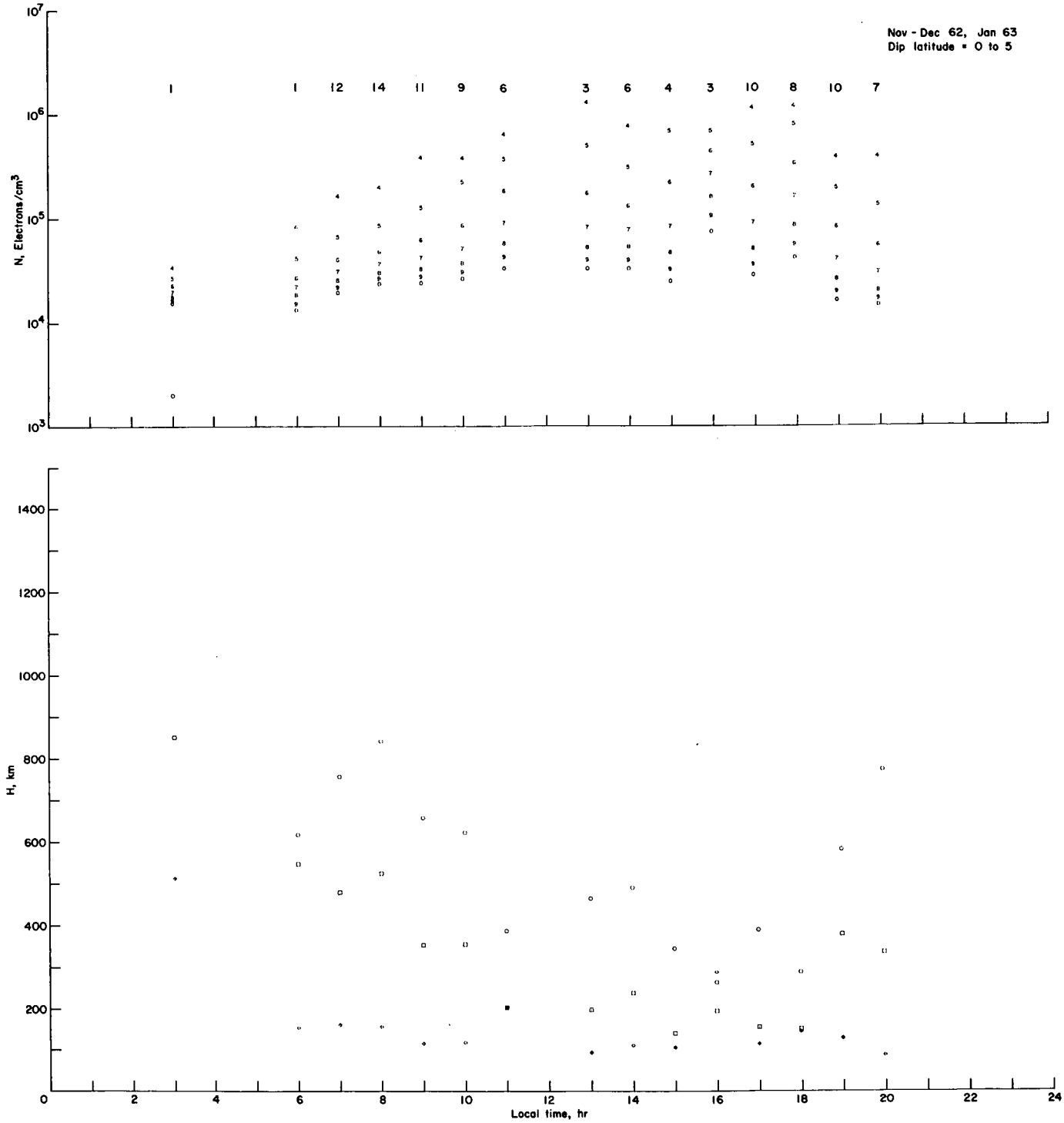

Nov - Dec 62, Jan 63
Dip latitude = 0 to 5
N, Electrons/cm3
H, km
Local time, hr

Figure 237

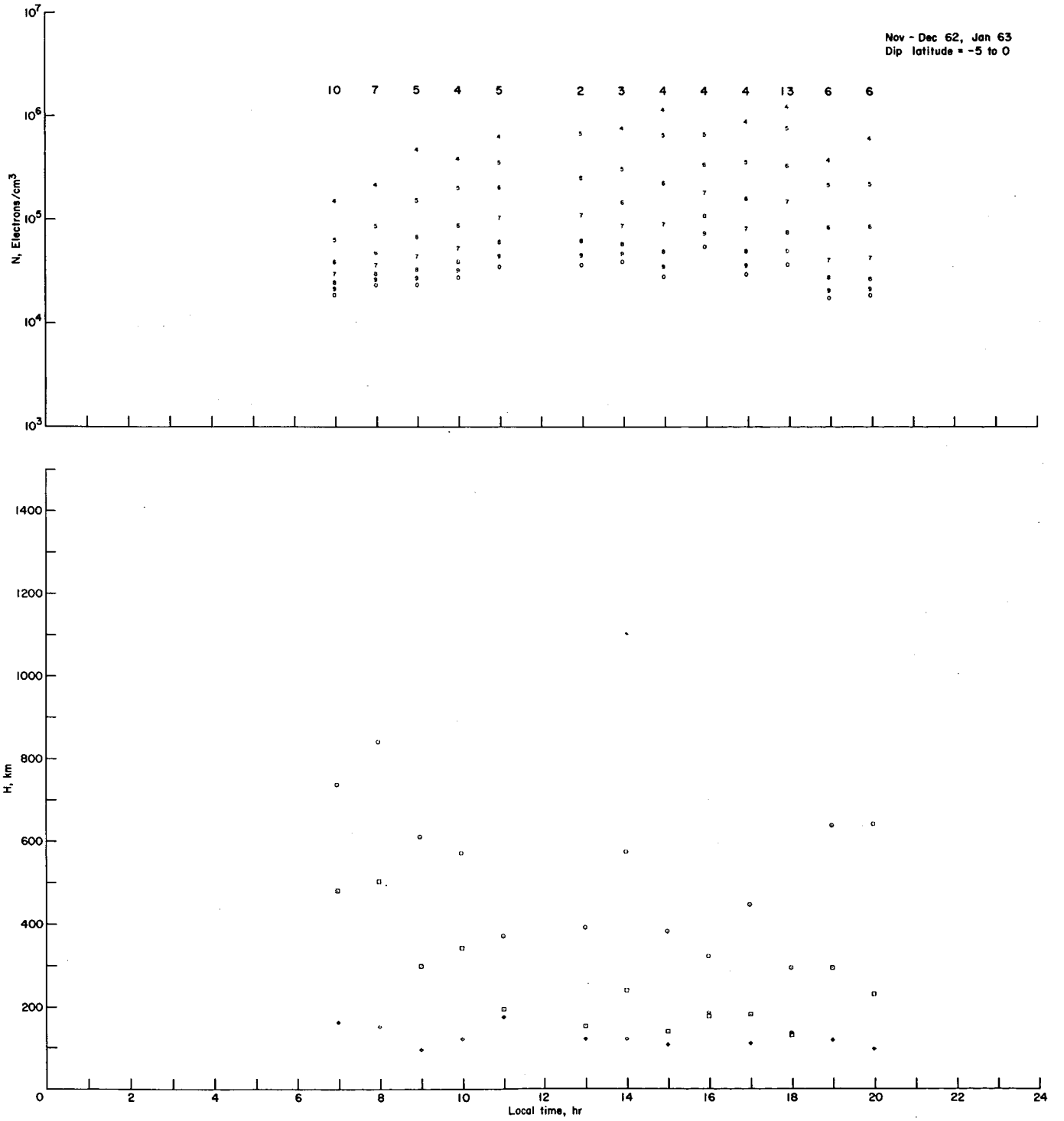

Nov - Dec 62, Jan 63
Dip latitude = -5 to 0
10 7 5 4 5 2 3 4 4 4 13 6 6
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 238

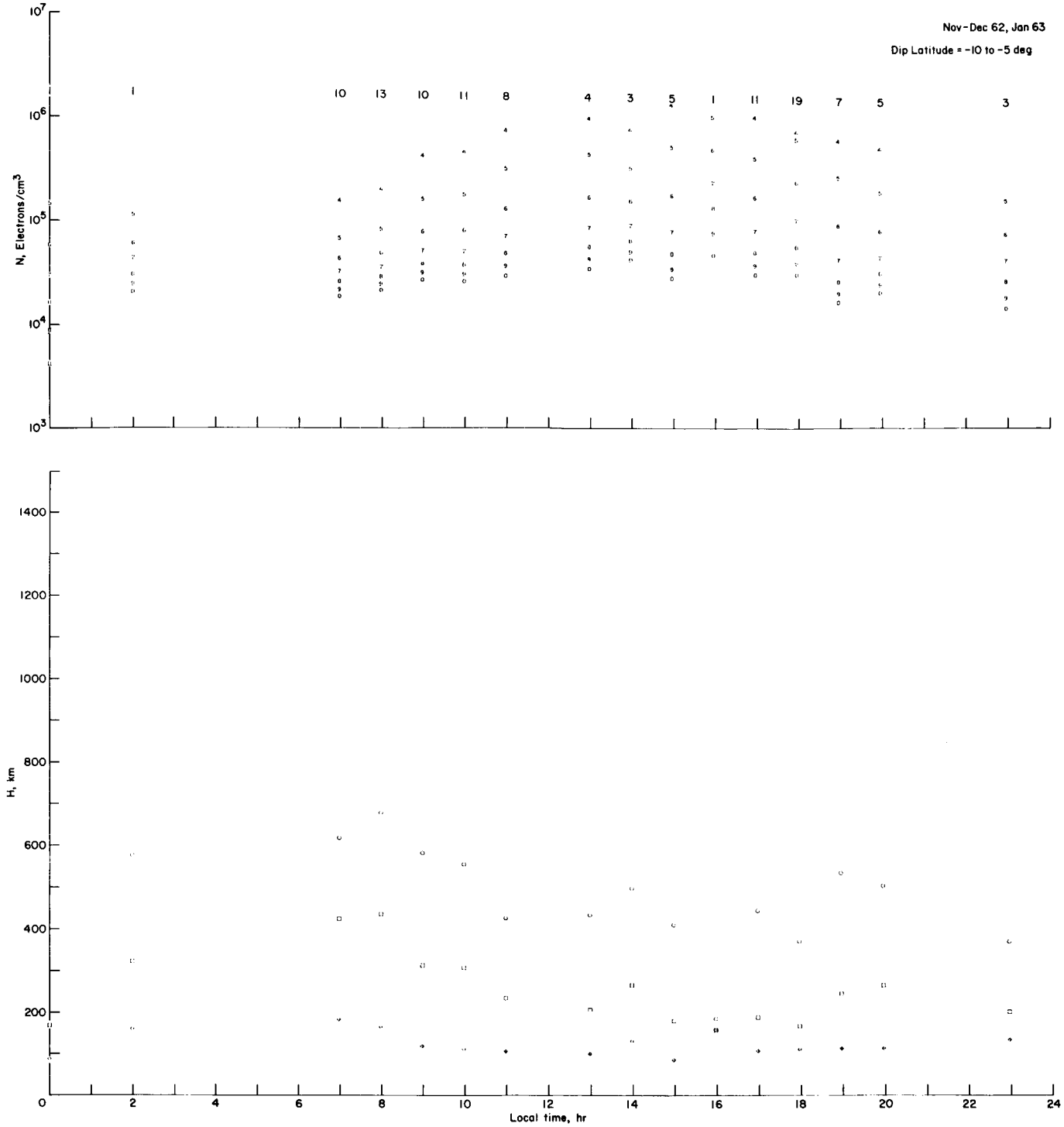

Nov-Dec 62, Jan 63
Dip Latitude = -10 to -5 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 239

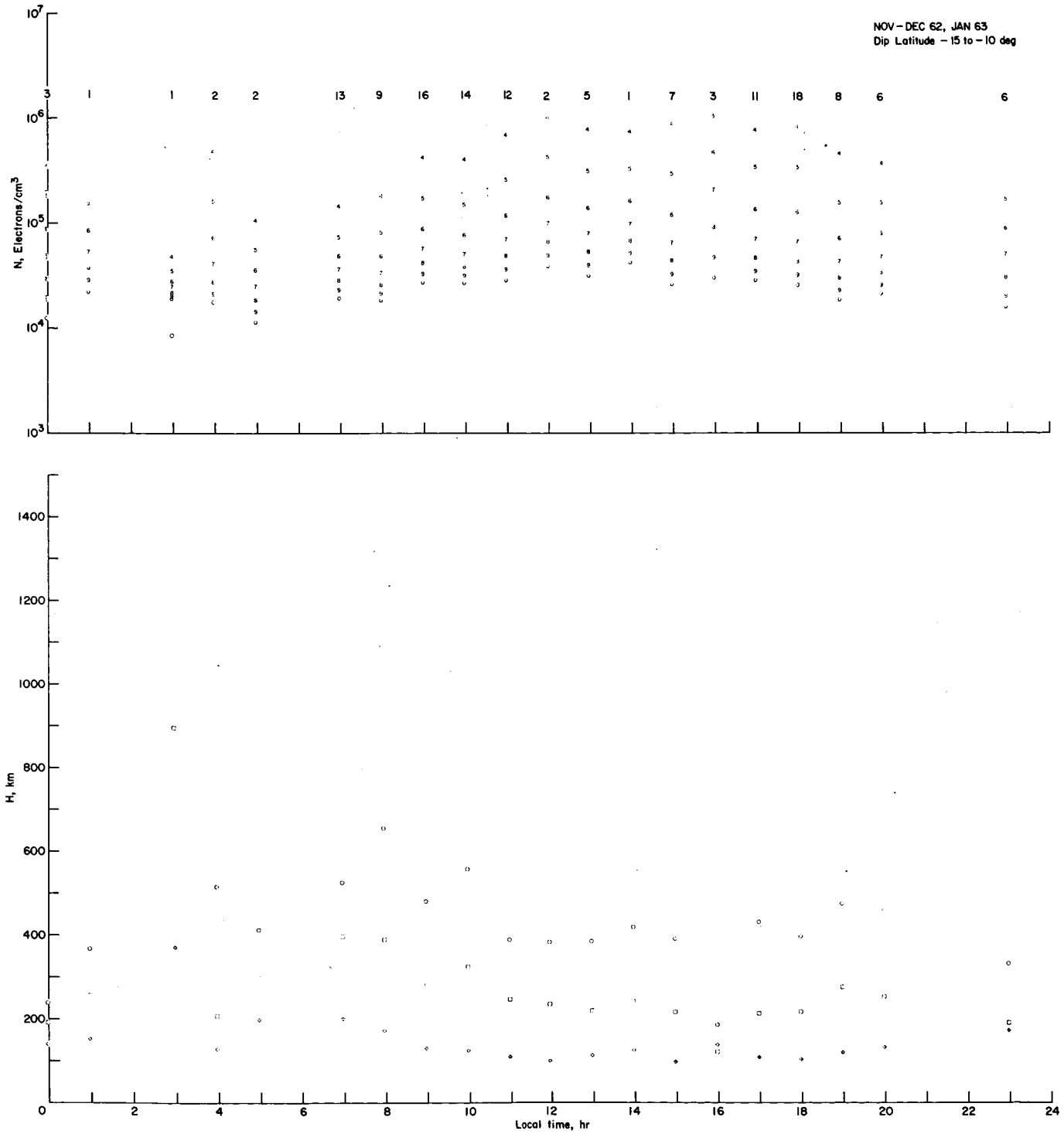

NOV – DEC 62, JAN 63
Dip Latitude – 15 to – 10 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 240

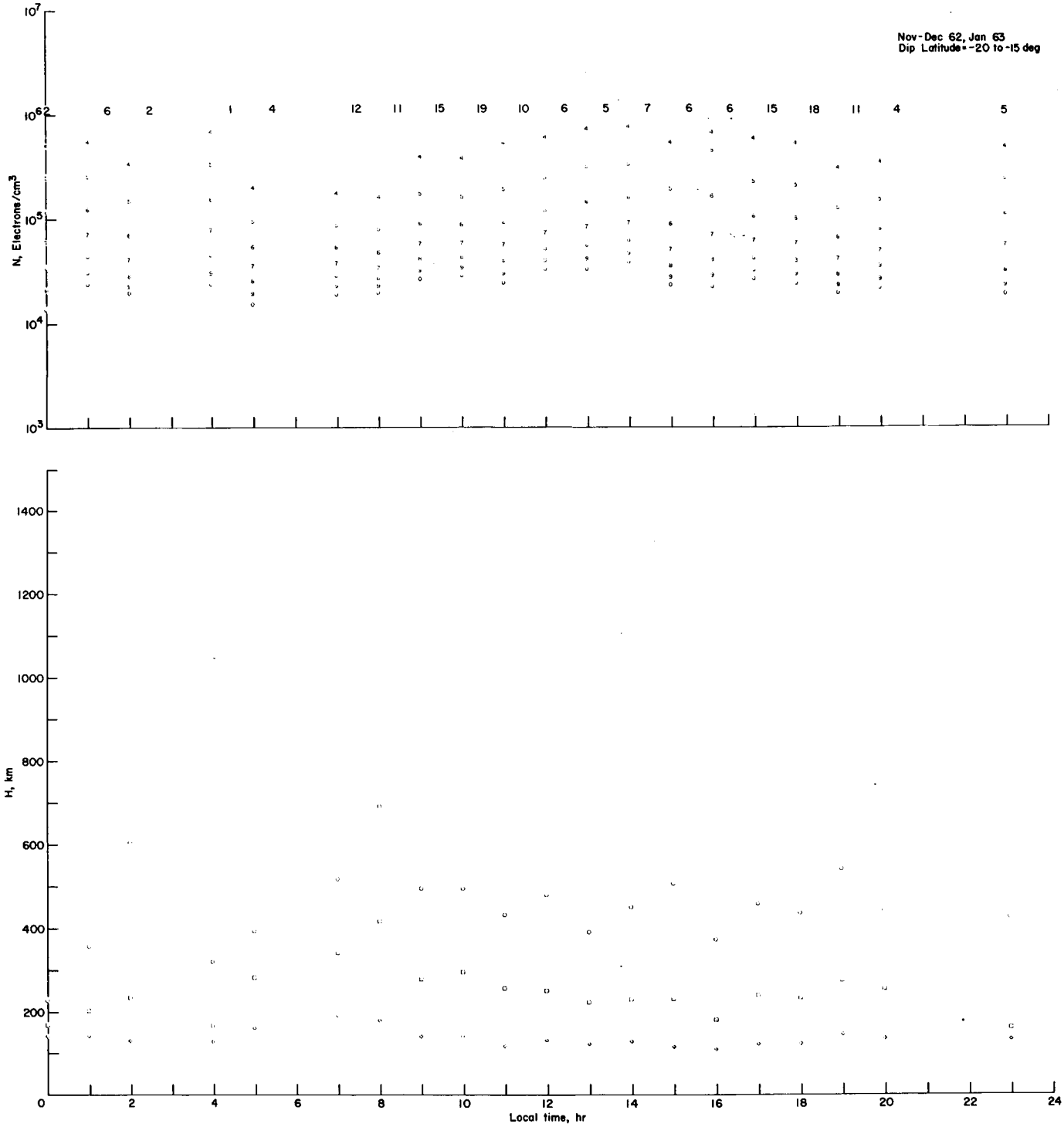

Nov-Dec 62, Jan 63
Dip Latitude = -20 to -15 deg
6 2 1 4 12 11 15 19 10 6 5 7 6 6 15 18 11 4 5
N, Electrons/cm3
H, km
Local time, hr

Figure 241

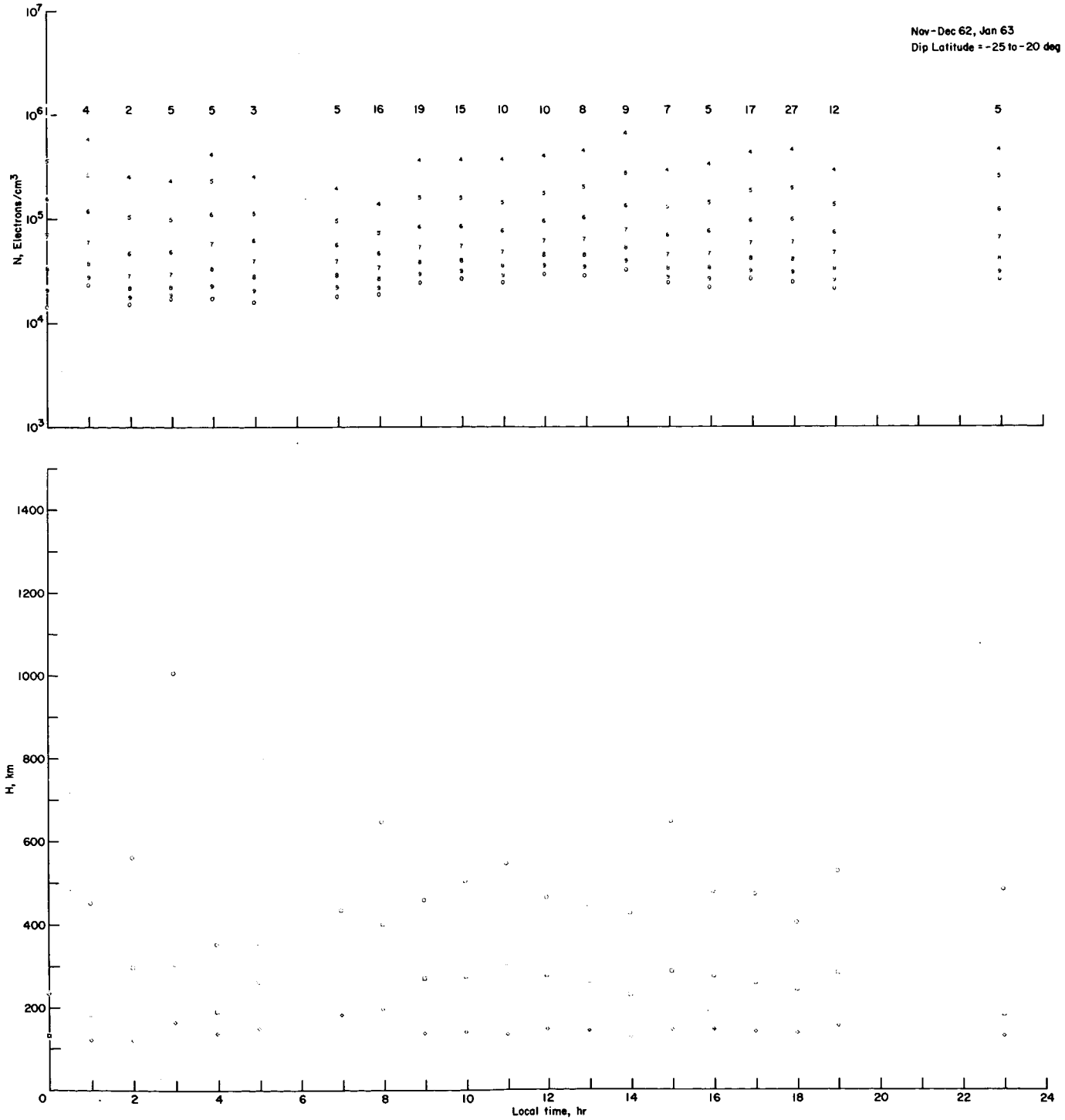

Nov-Dec 62, Jan 63
Dip Latitude = -25 to -20 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 242

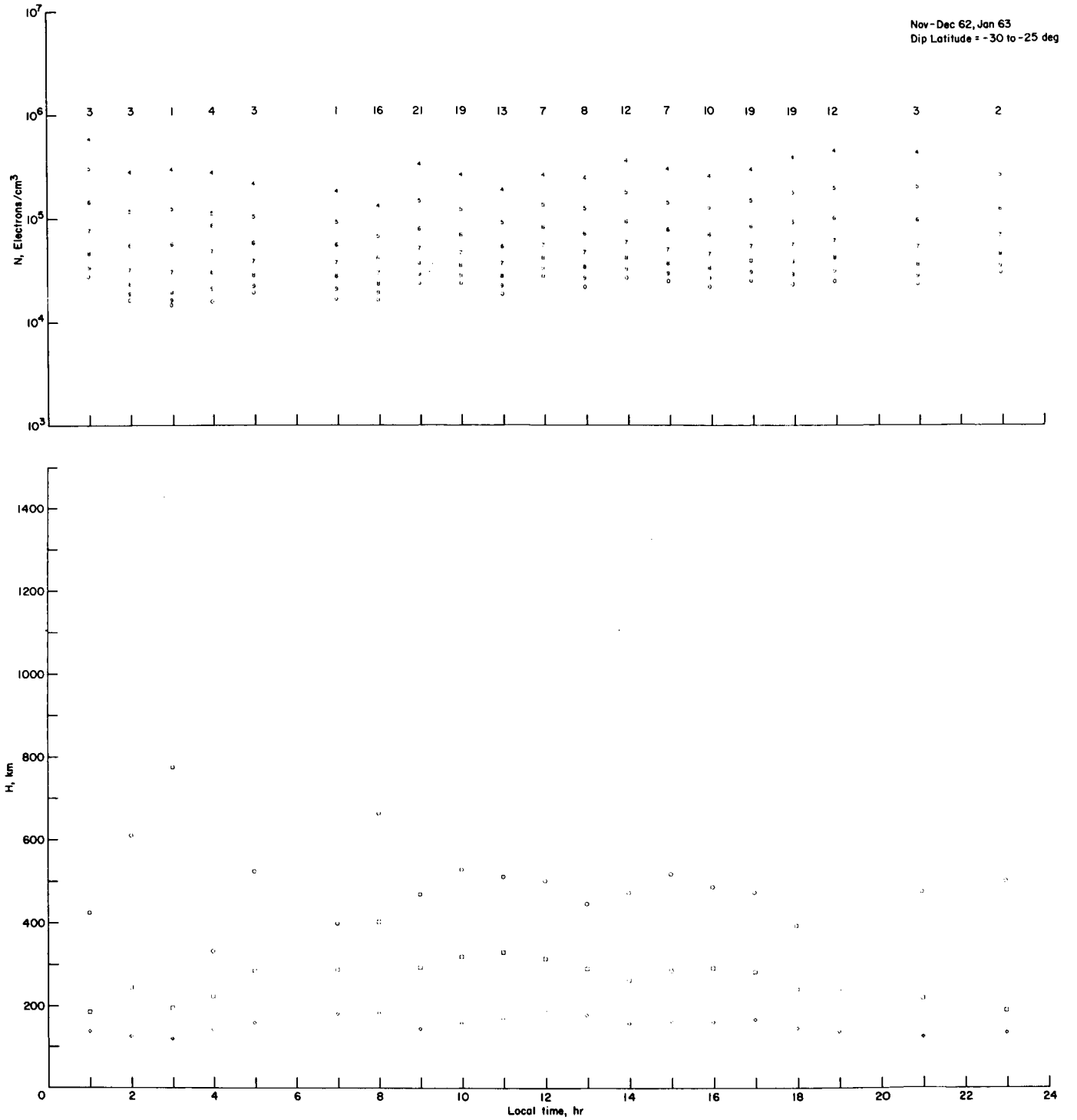

Nov-Dec 62, Jan 63
Dip Latitude = -30 to -25 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 243

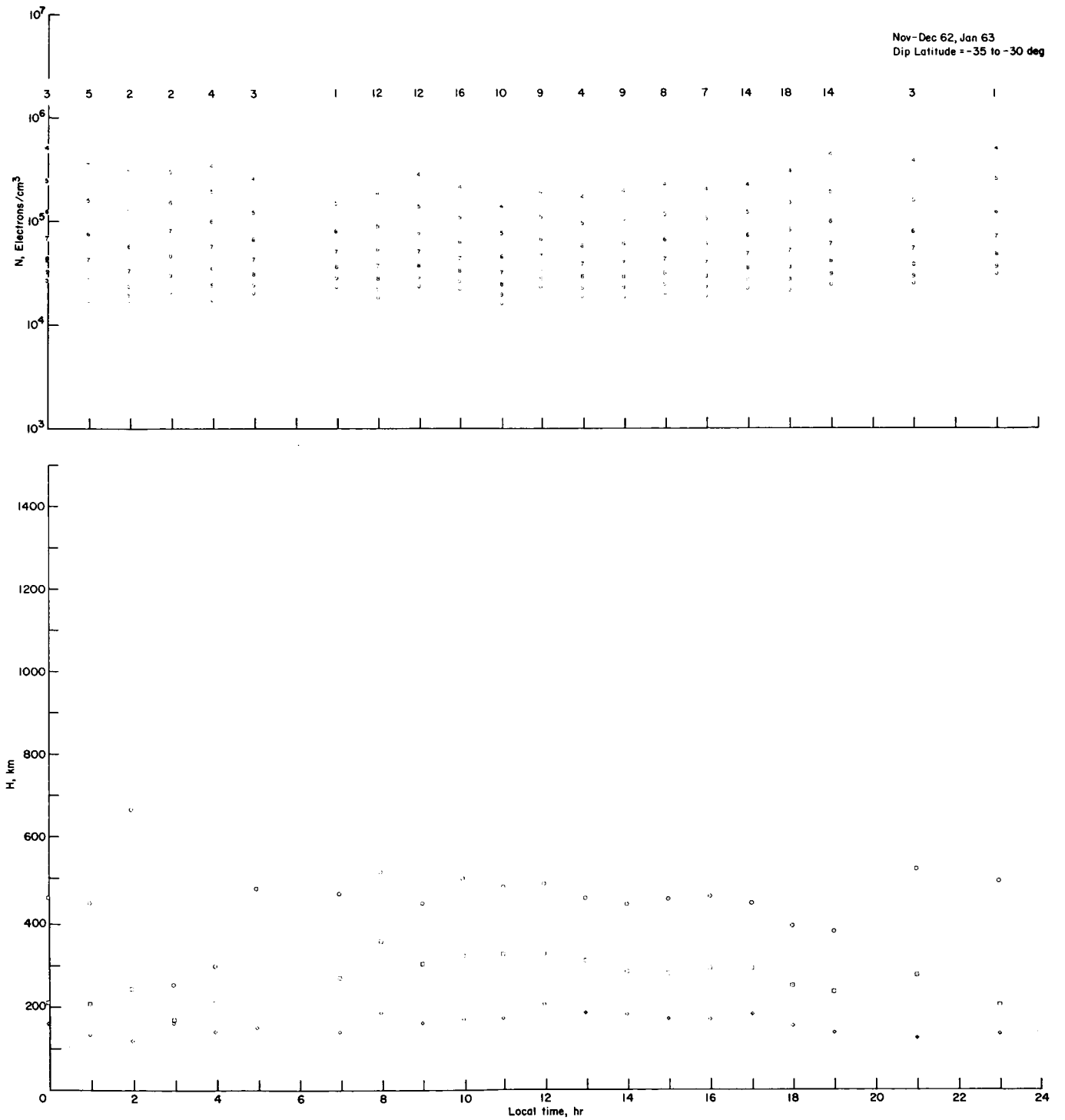

Nov-Dec 62, Jan 63
Dip Latitude = -35 to -30 deg
3 5 2 2 4 3 1 12 12 16 10 9 4 9 8 7 14 18 14 3 1
N, Electrons/cm3
H, km
Local time, hr

Figure 244

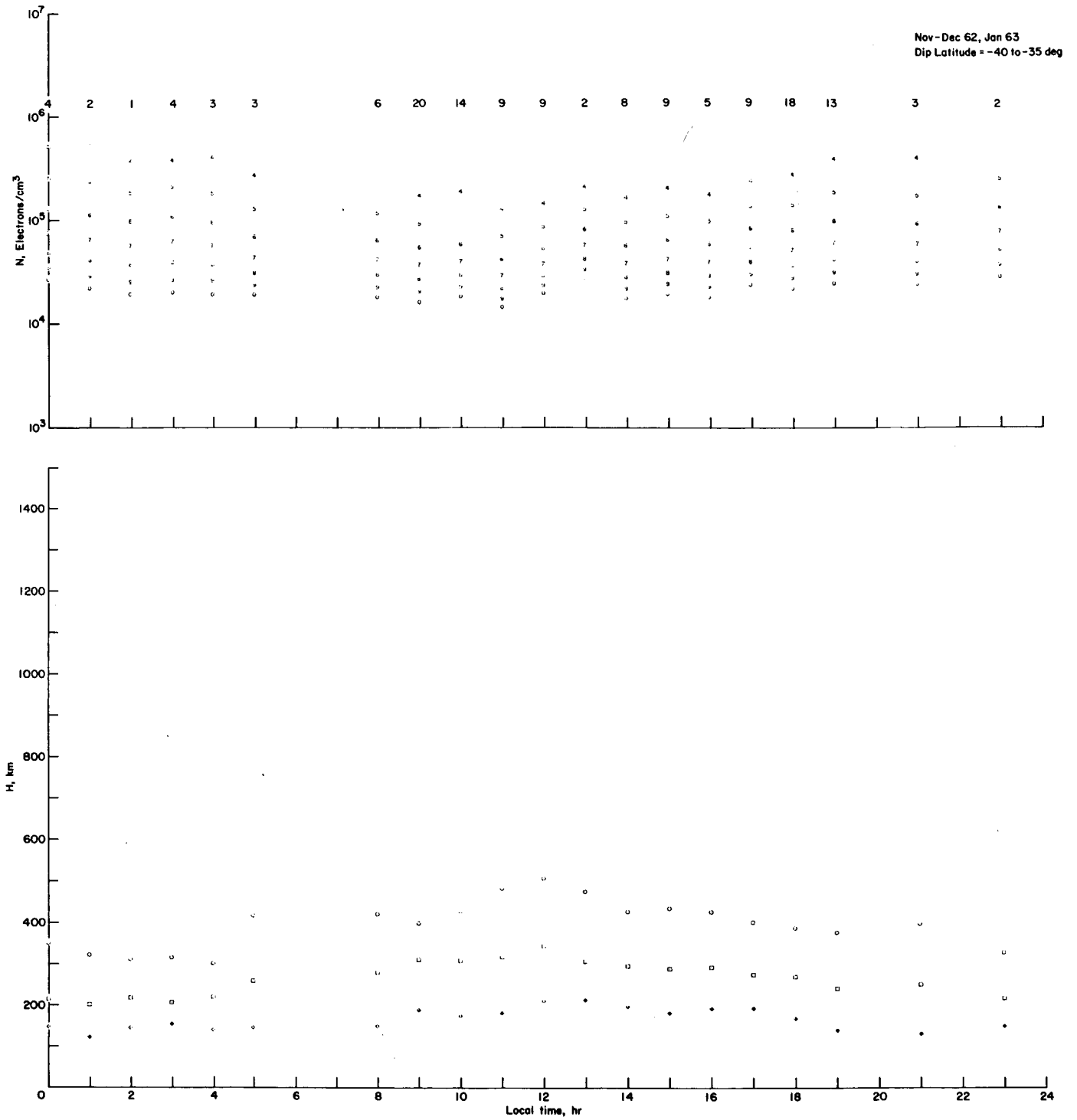

Nov-Dec 62, Jan 63
Dip Latitude = -40 to -35 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 245

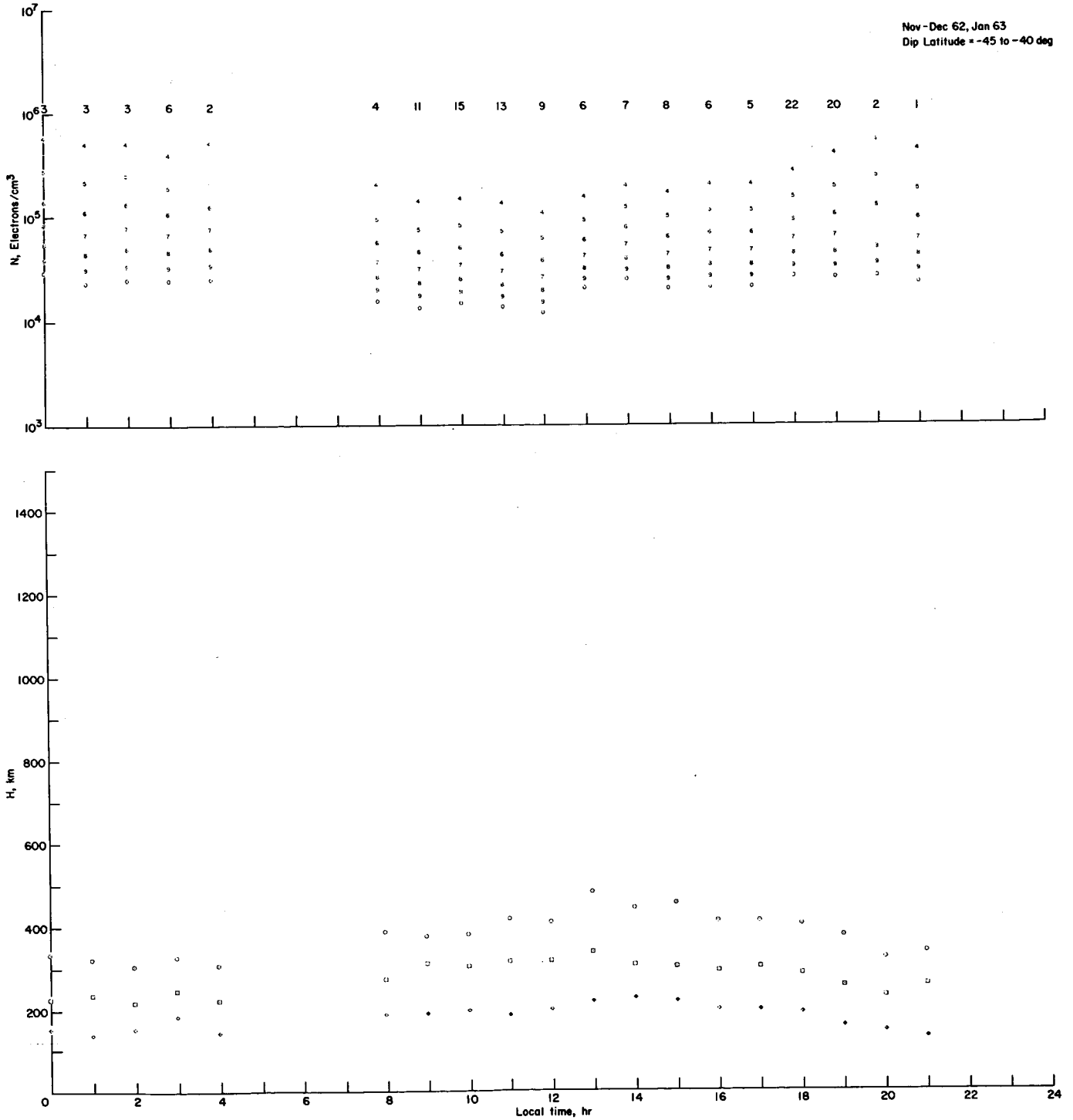

Nov-Dec 62, Jan 63
Dip Latitude = -45 to -40 deg
3 3 6 2 4 11 15 13 9 6 7 8 6 5 22 20 2 1
N, Electrons/cm3
H, km
Local time, hr

Figure 246

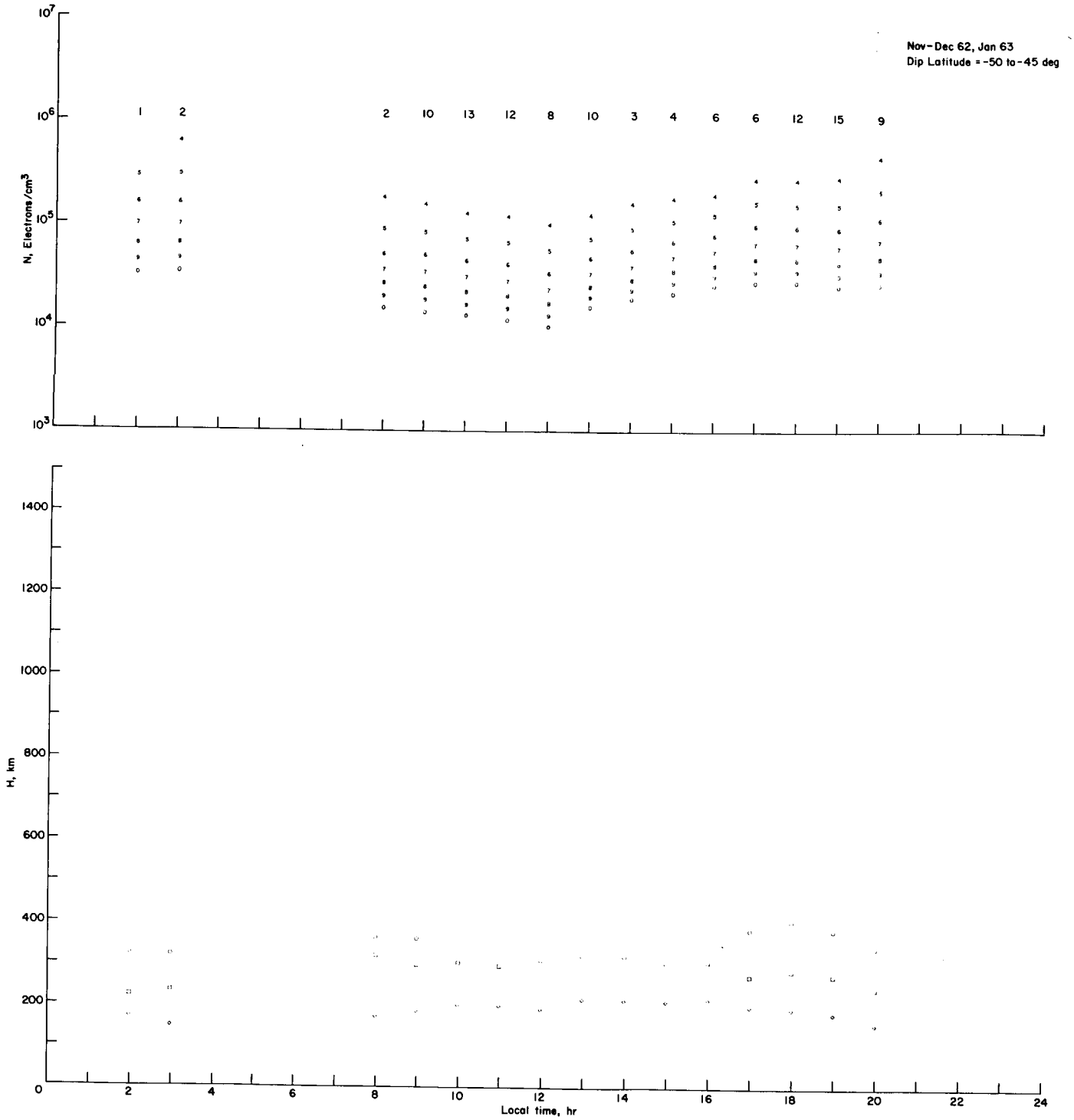

Nov-Dec 62, Jan 63
Dip Latitude = -50 to -45 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 247

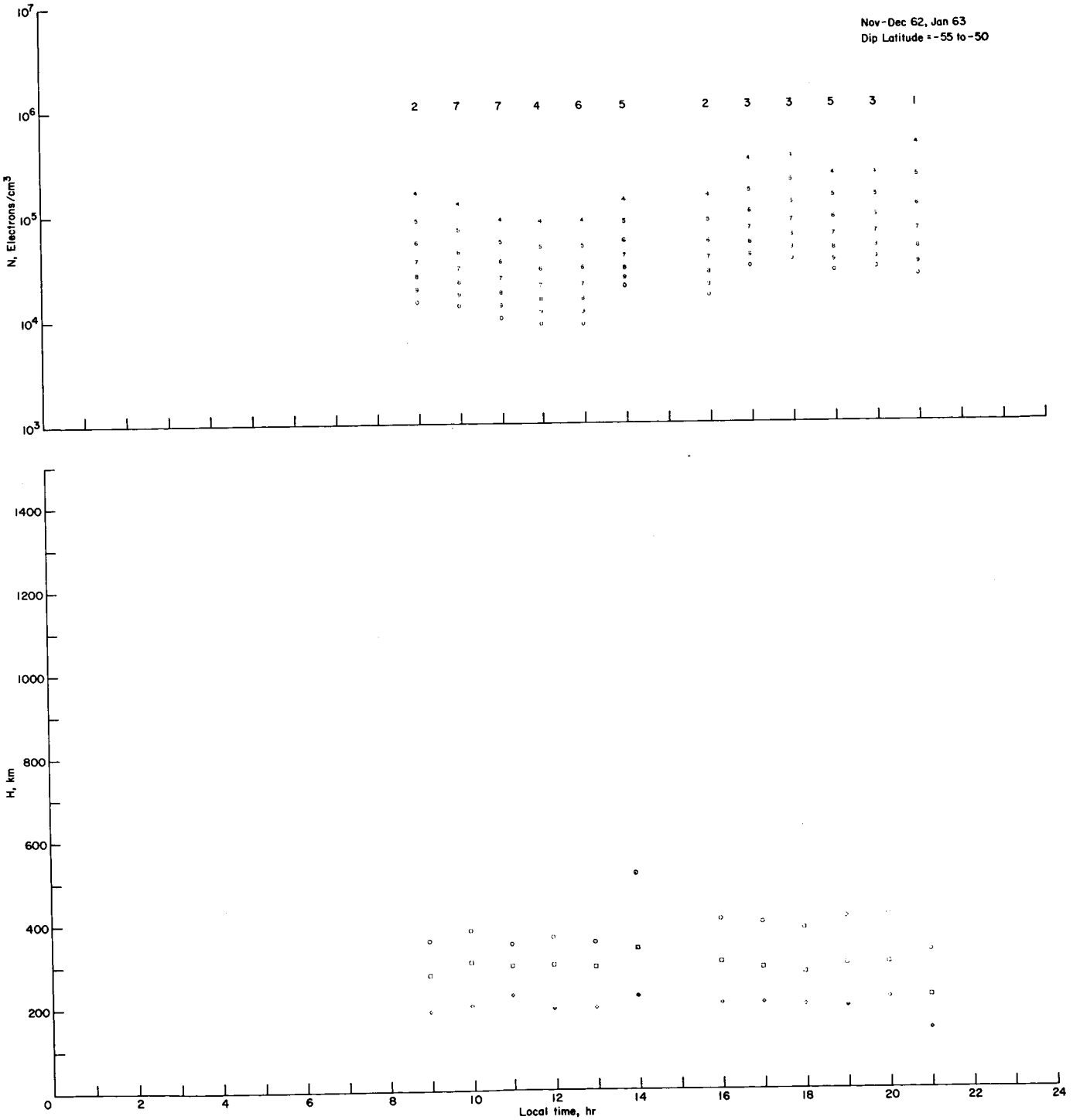

Nov-Dec 62, Jan 63
Dip Latitude = -55 to -50
N, Electrons/cm³
H, km
Local time, hr

Figure 248

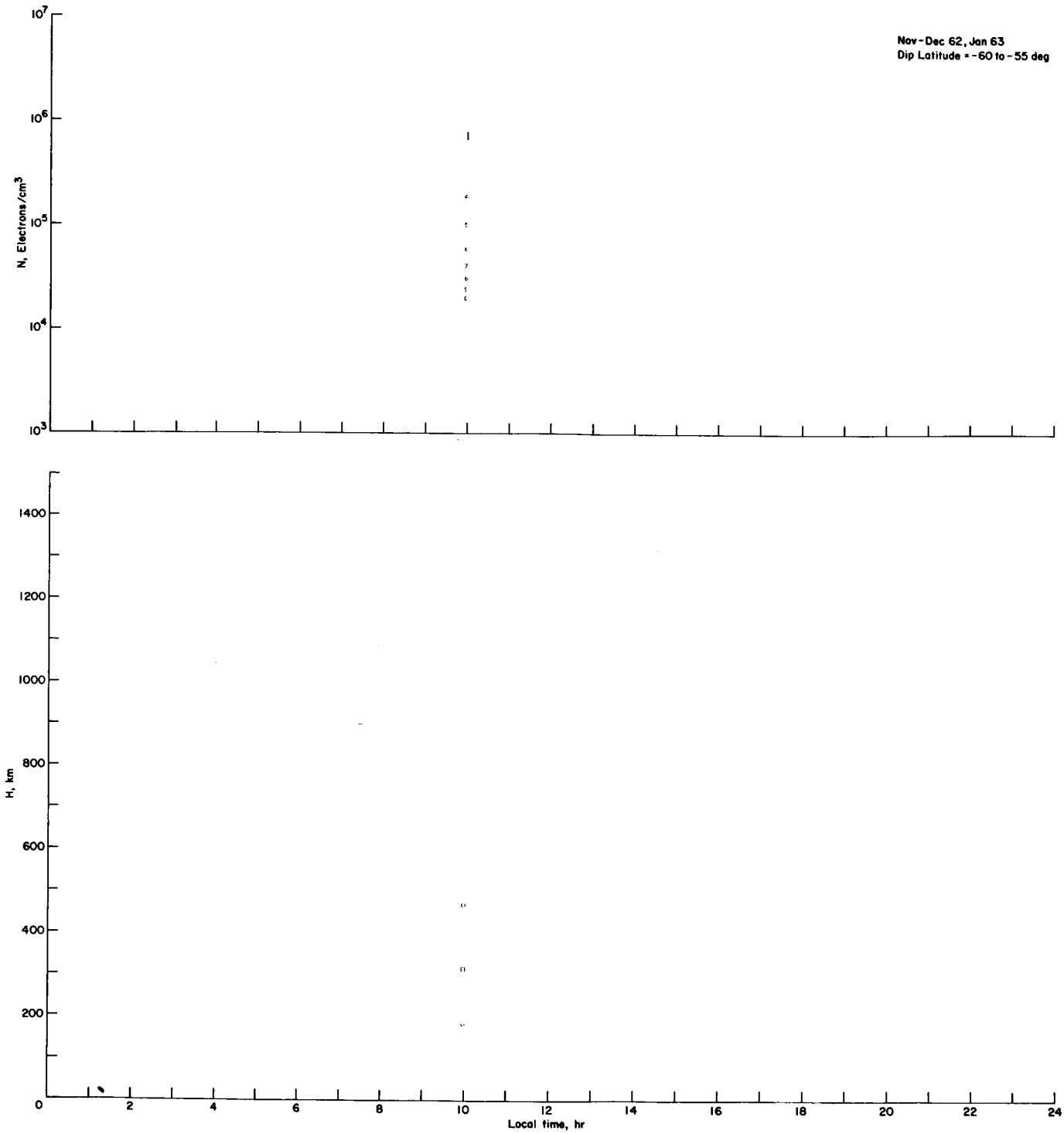

Nov-Dec 62, Jan 63
Dip Latitude = -60 to -55 deg
N, Electrons/cm³
10⁷
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 249

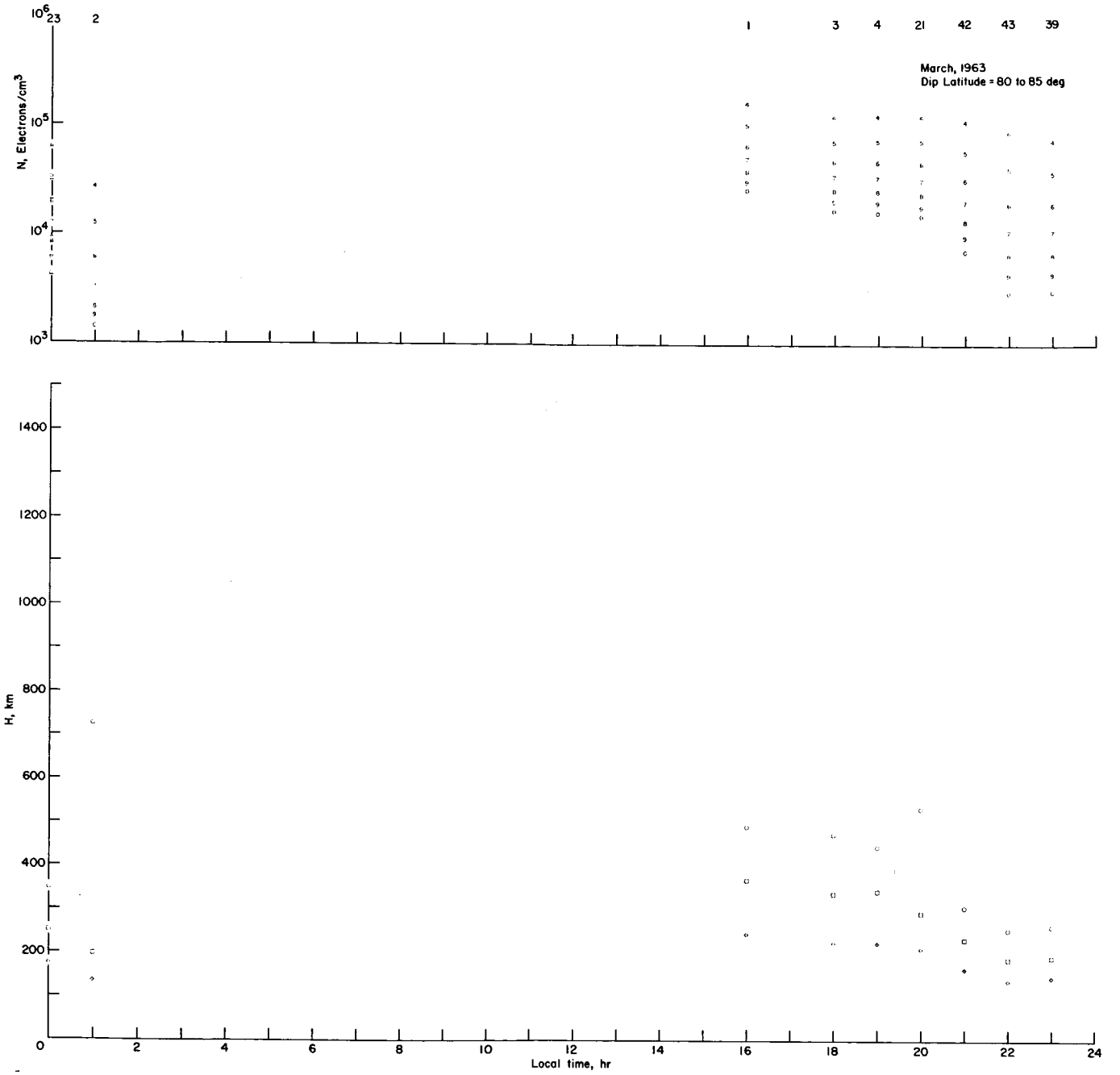

March, 1963
Dip Latitude = 80 to 85 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 250

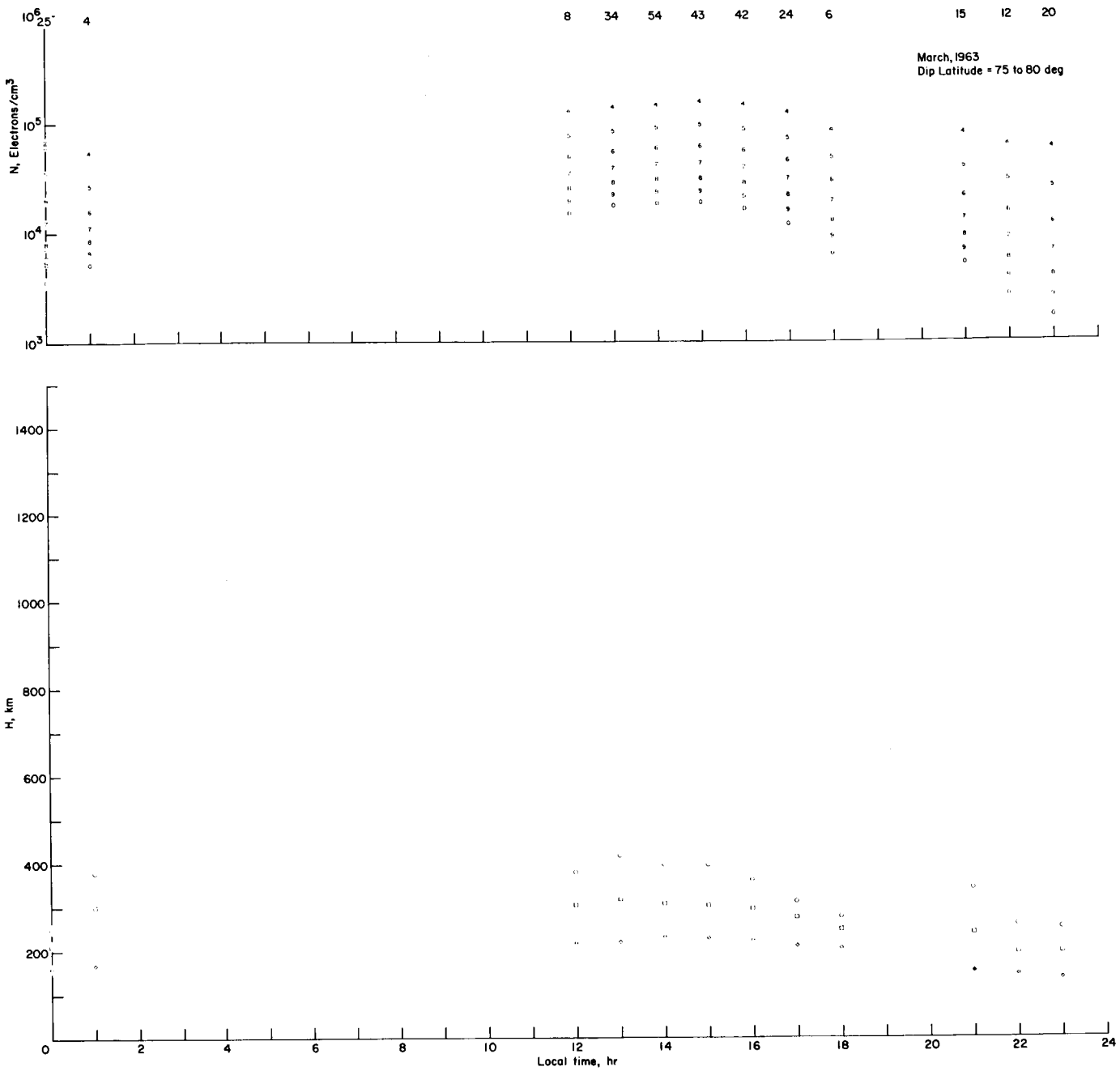

N, Electrons/cm³
10⁶
25
10⁵
10⁴
10³
4
8
34
54
43
42
24
6
15
12
20
March, 1963
Dip Latitude = 75 to 80 deg
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 251

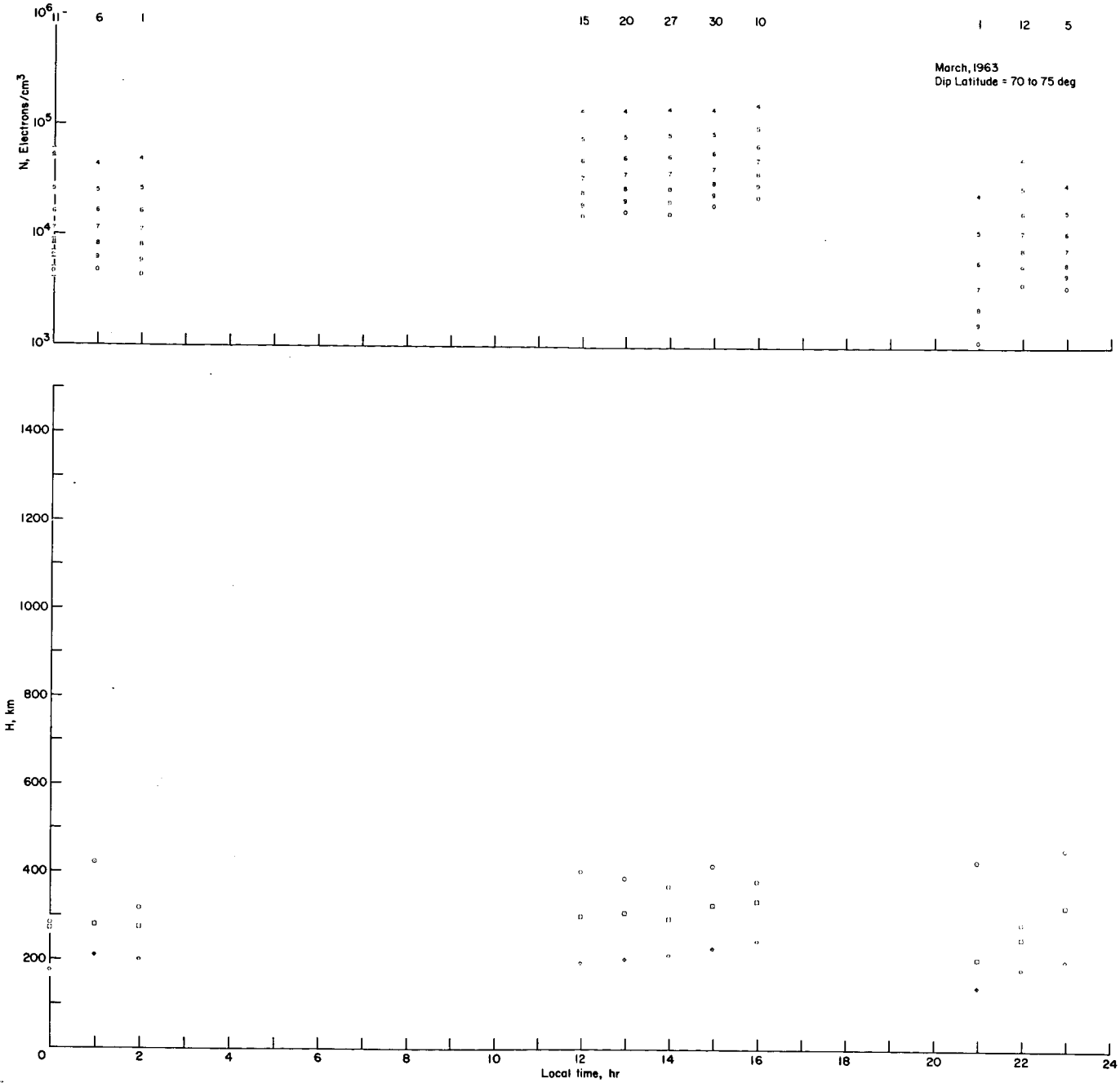

March, 1963
Dip Latitude = 70 to 75 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 252

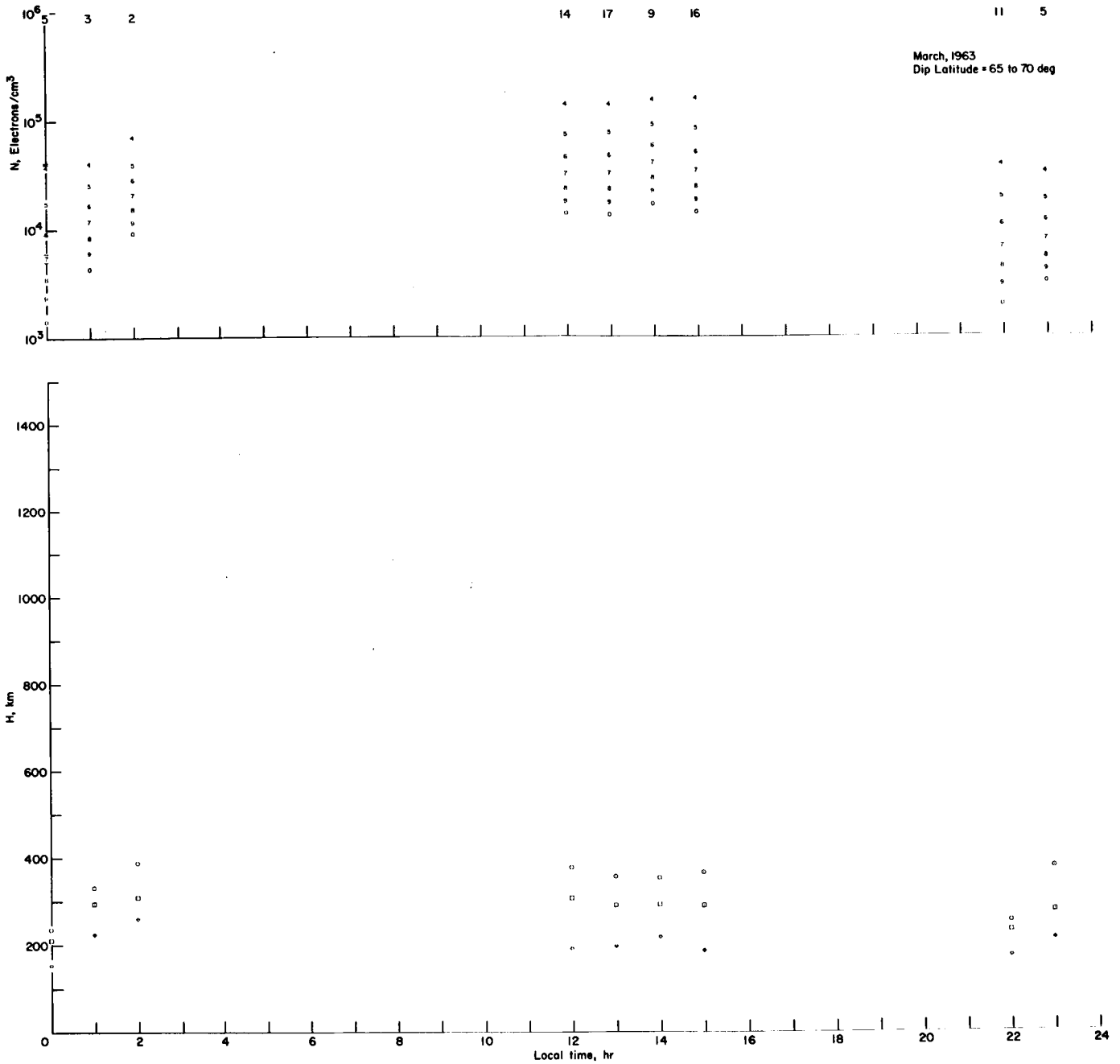

March, 1963
Dip Latitude = 65 to 70 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 253

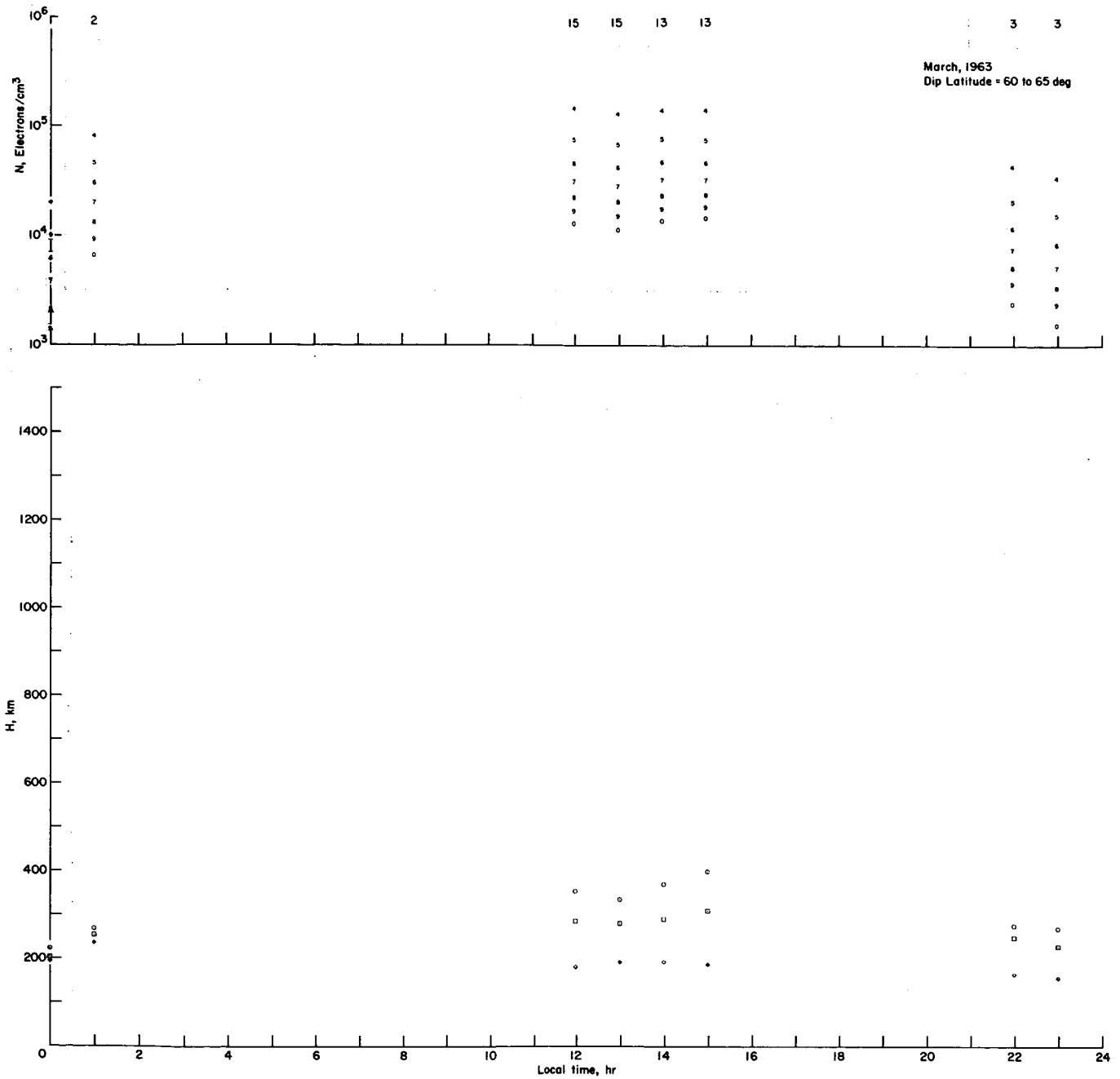

March, 1963
Dip Latitude = 60 to 65 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 254

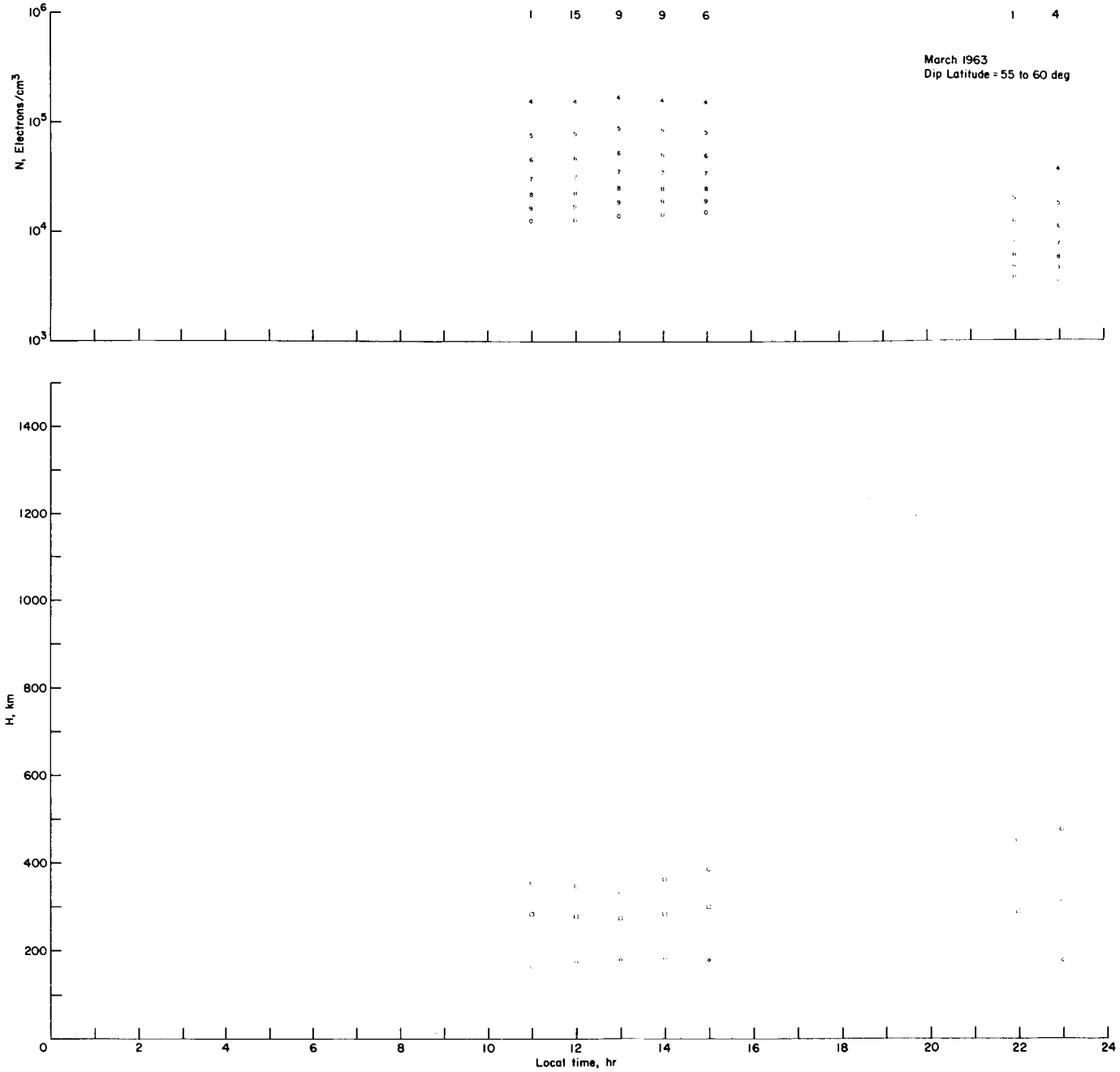

1 15 9 9 6 1 4
March 1963
Dip Latitude = 55 to 60 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 255

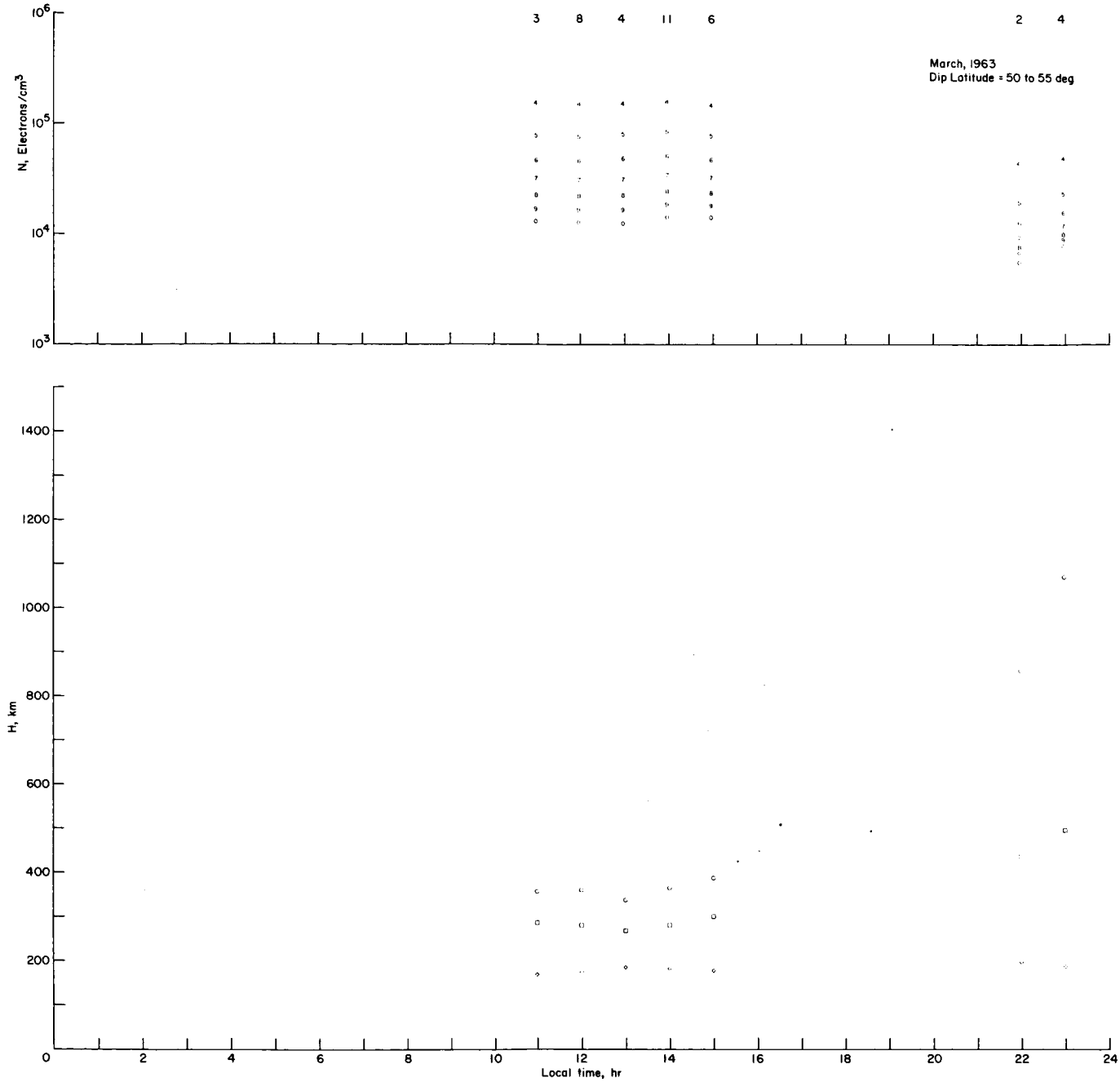

March, 1963
Dip Latitude = 50 to 55 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 256

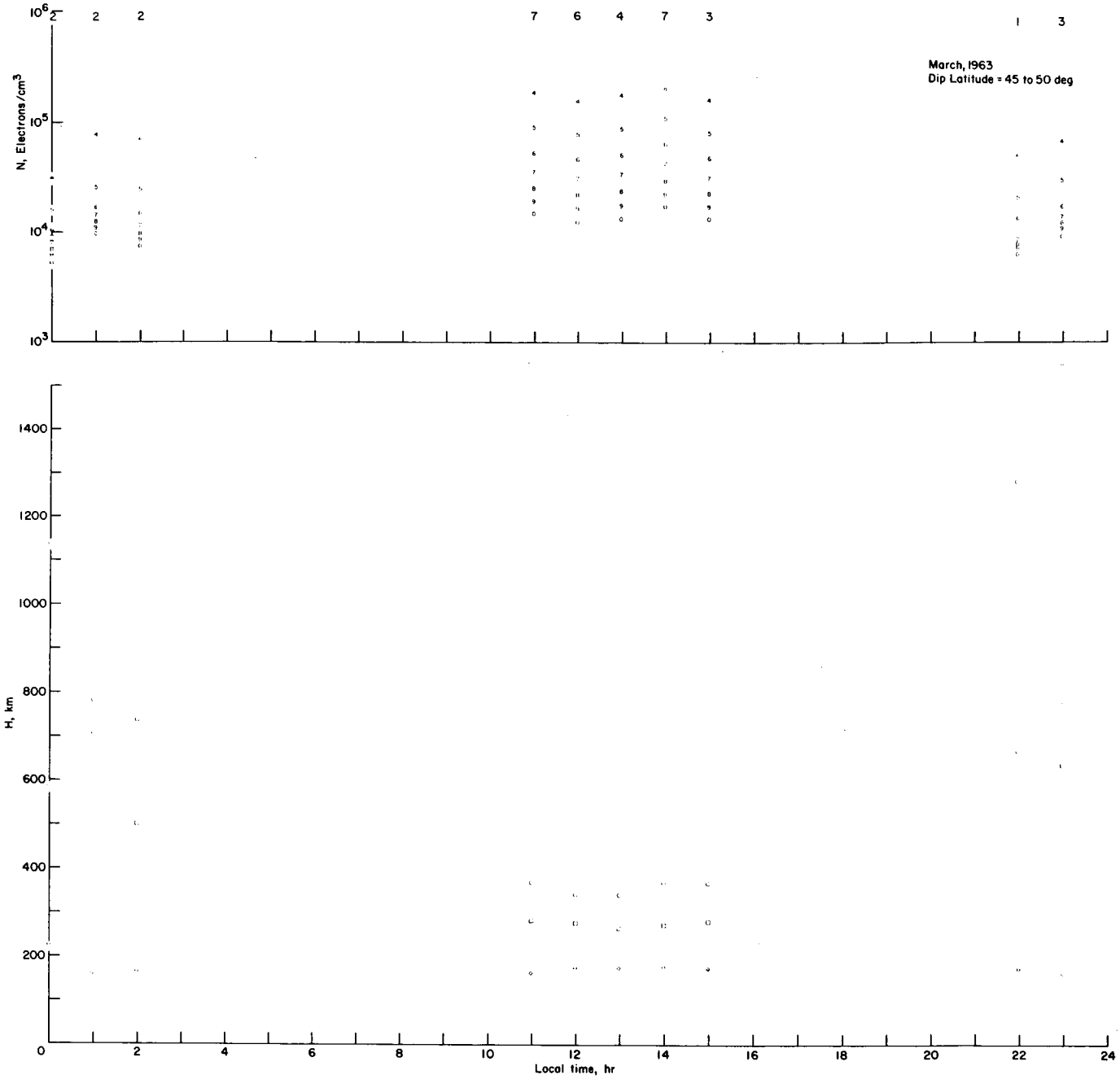

March, 1963
Dip Latitude = 45 to 50 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 257

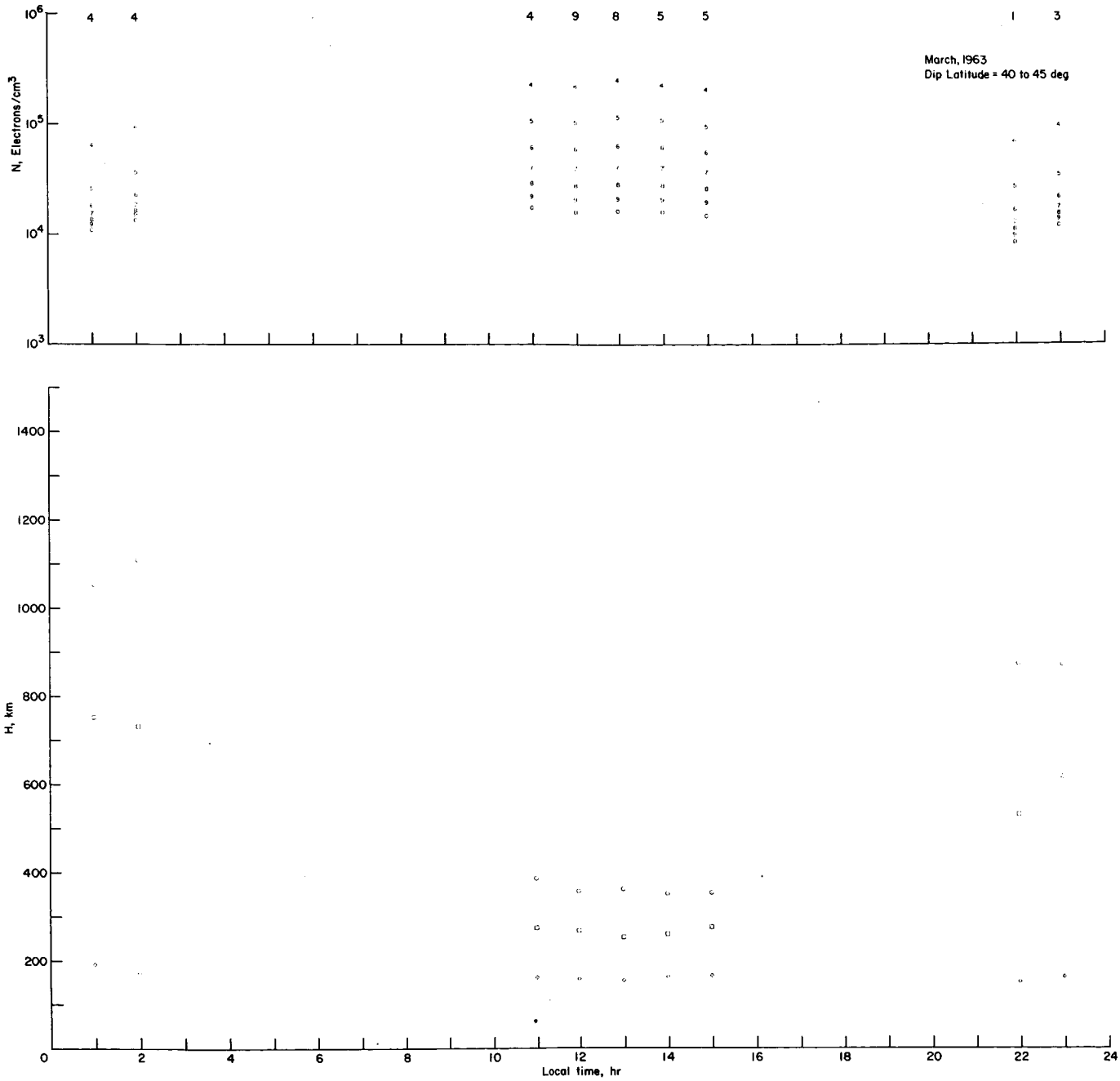

N, Electrons/cm³
10⁶
10⁵
10⁴
10³
4 4 4 9 8 5 5 1 3
March, 1963
Dip Latitude = 40 to 45 deg
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 258

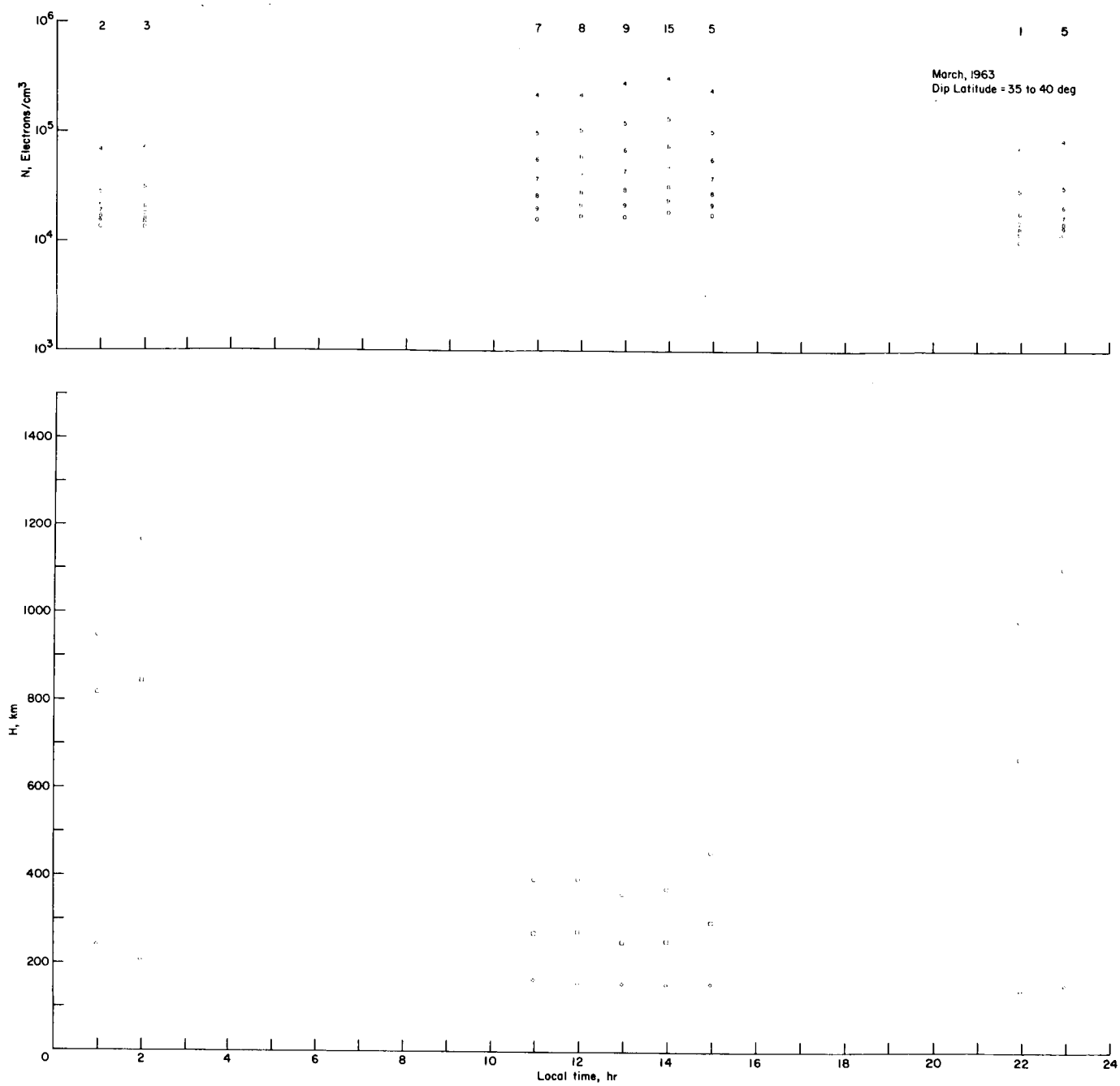

N, Electrons/cm3
10^6
10^5
10^4
10^3
2 3 7 8 9 15 5 1 5
March, 1963
Dip Latitude = 35 to 40 deg
H, km
1400
1200
1000
800
600
400
200
0
2 4 6 8 10 12 14 16 18 20 22 24
Local time, hr

Figure 259

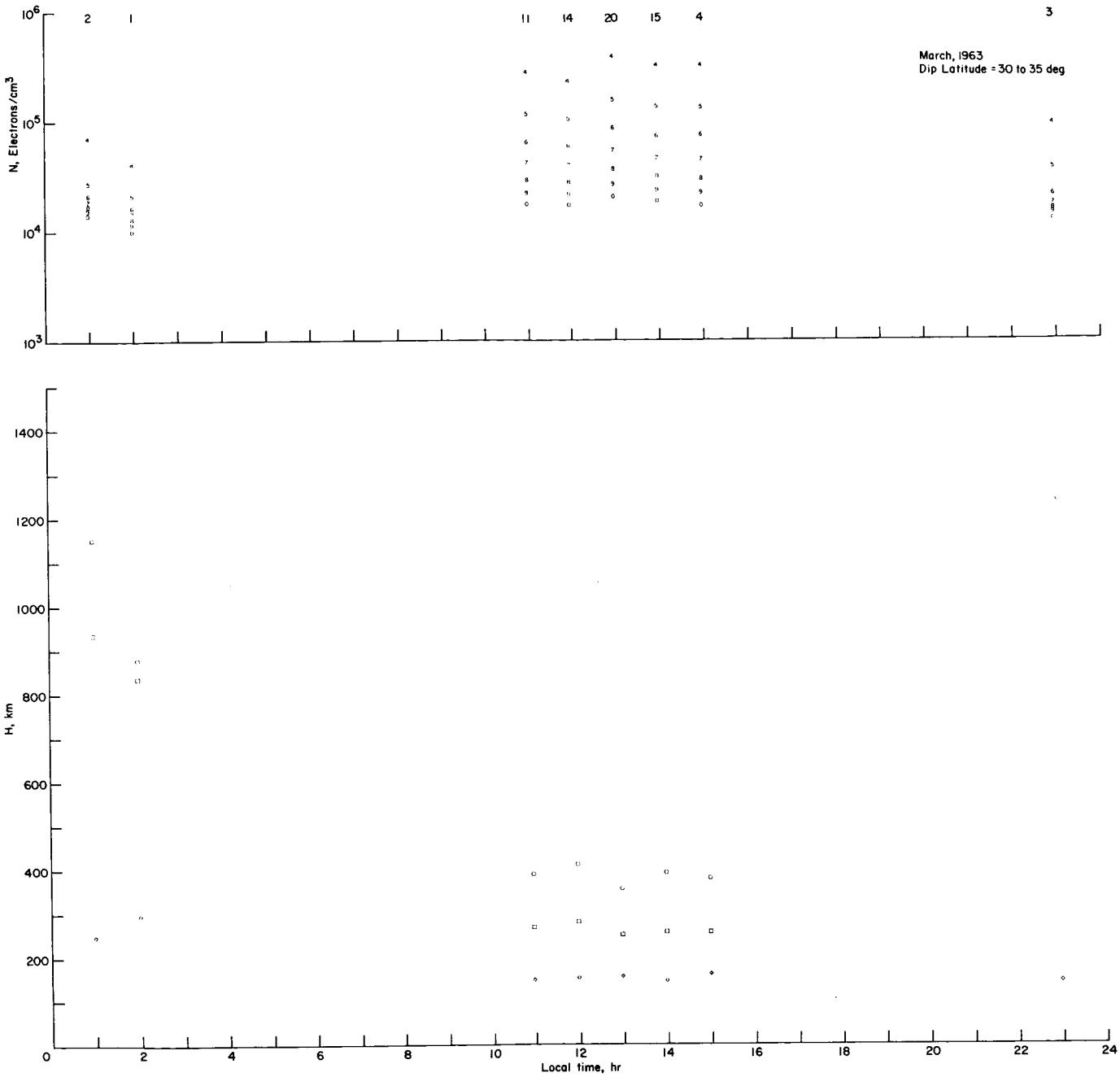

March, 1963
Dip Latitude = 30 to 35 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 260

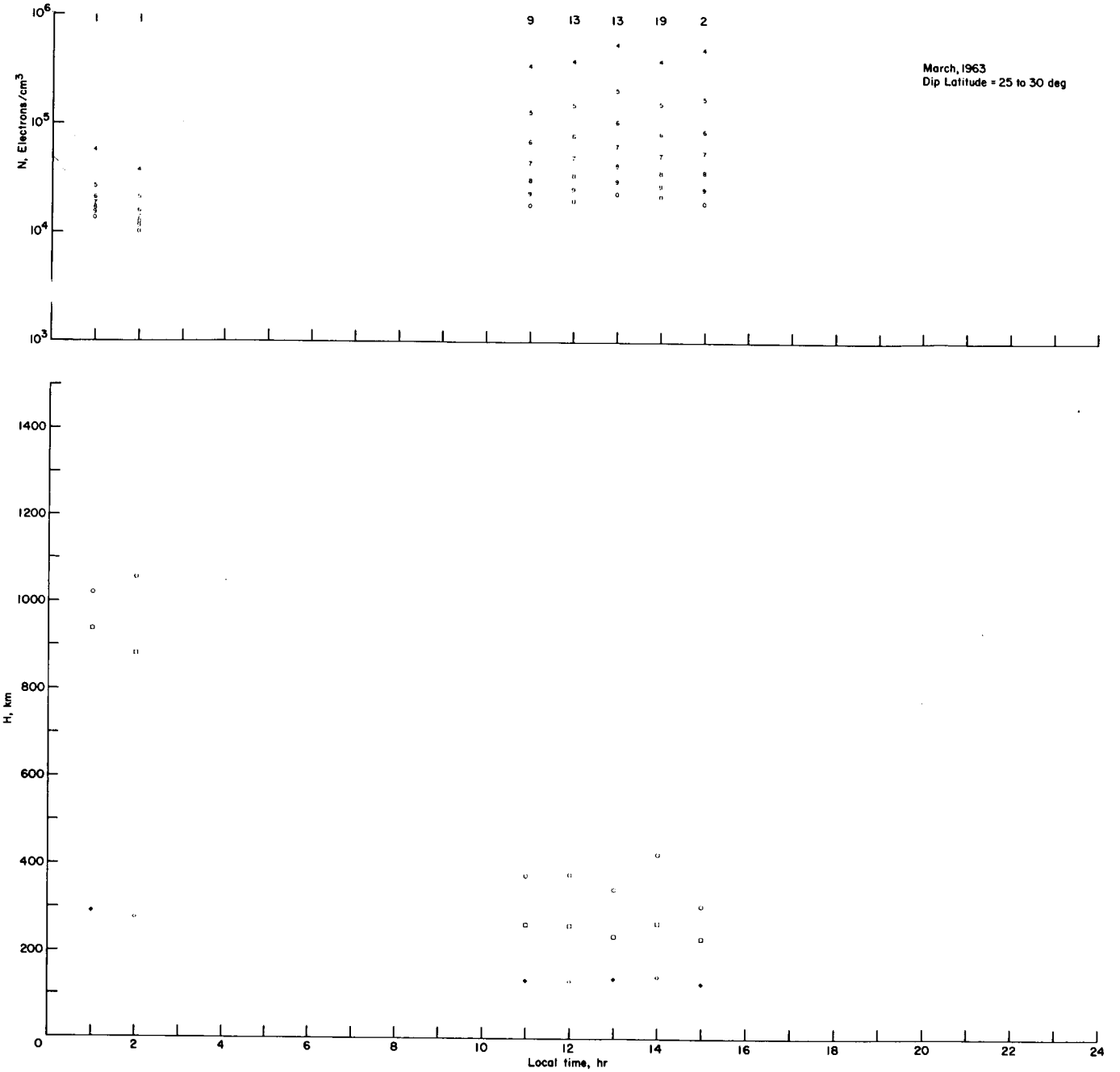

March, 1963
Dip Latitude = 25 to 30 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 261

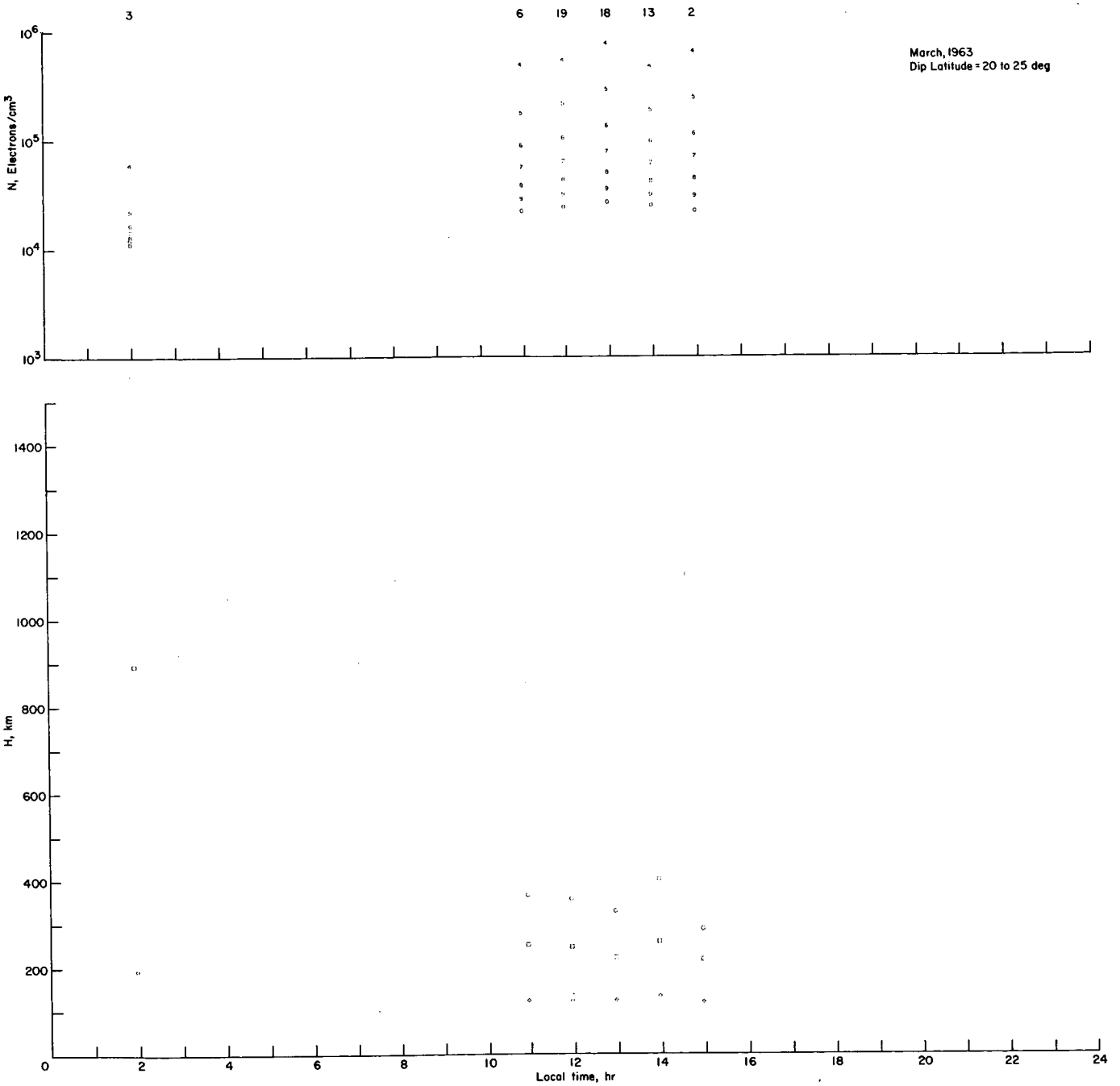

3
6
19
18
13
2
March, 1963
Dip Latitude = 20 to 25 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 262

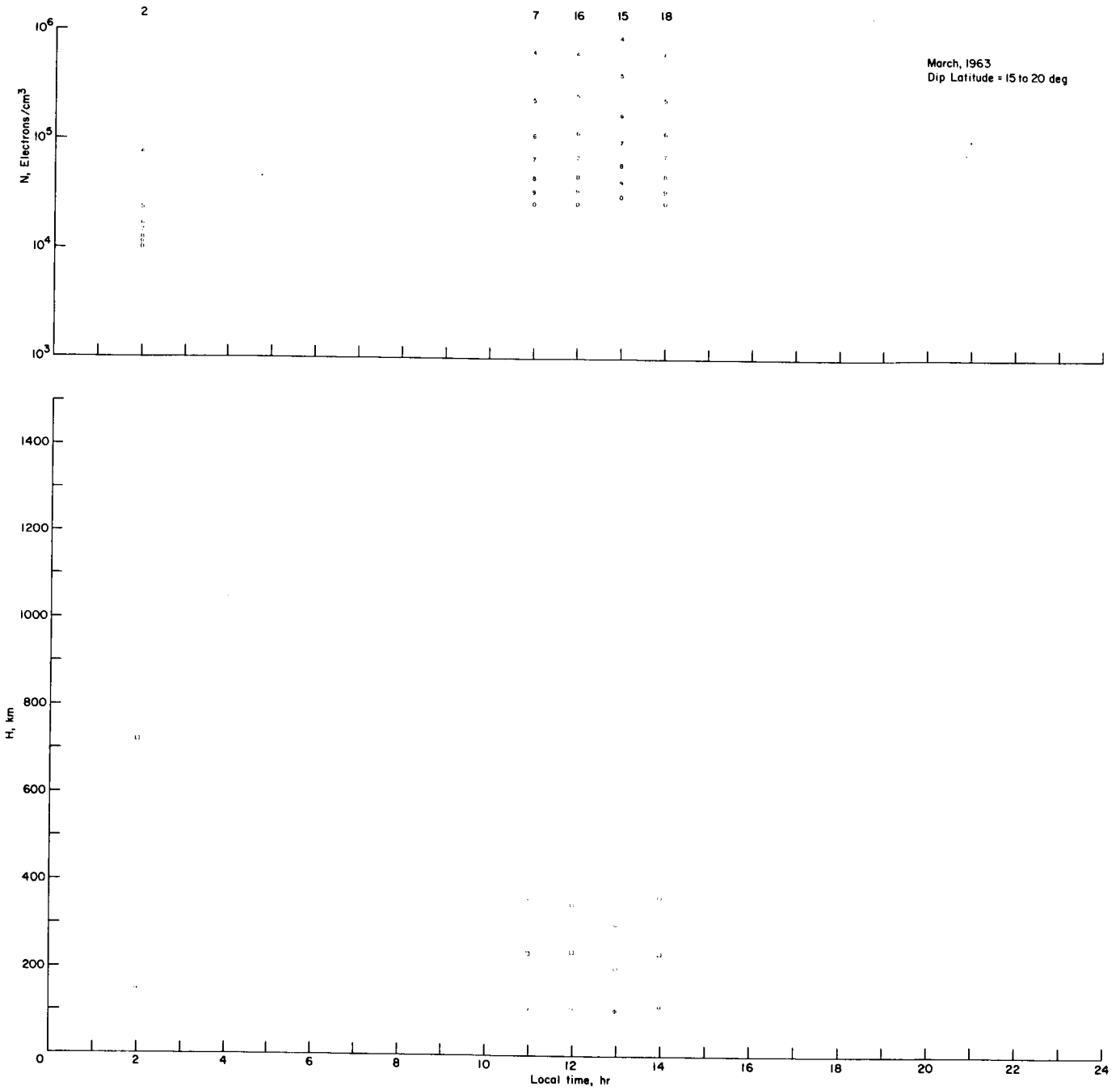

March, 1963
Dip Latitude = 15 to 20 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 263

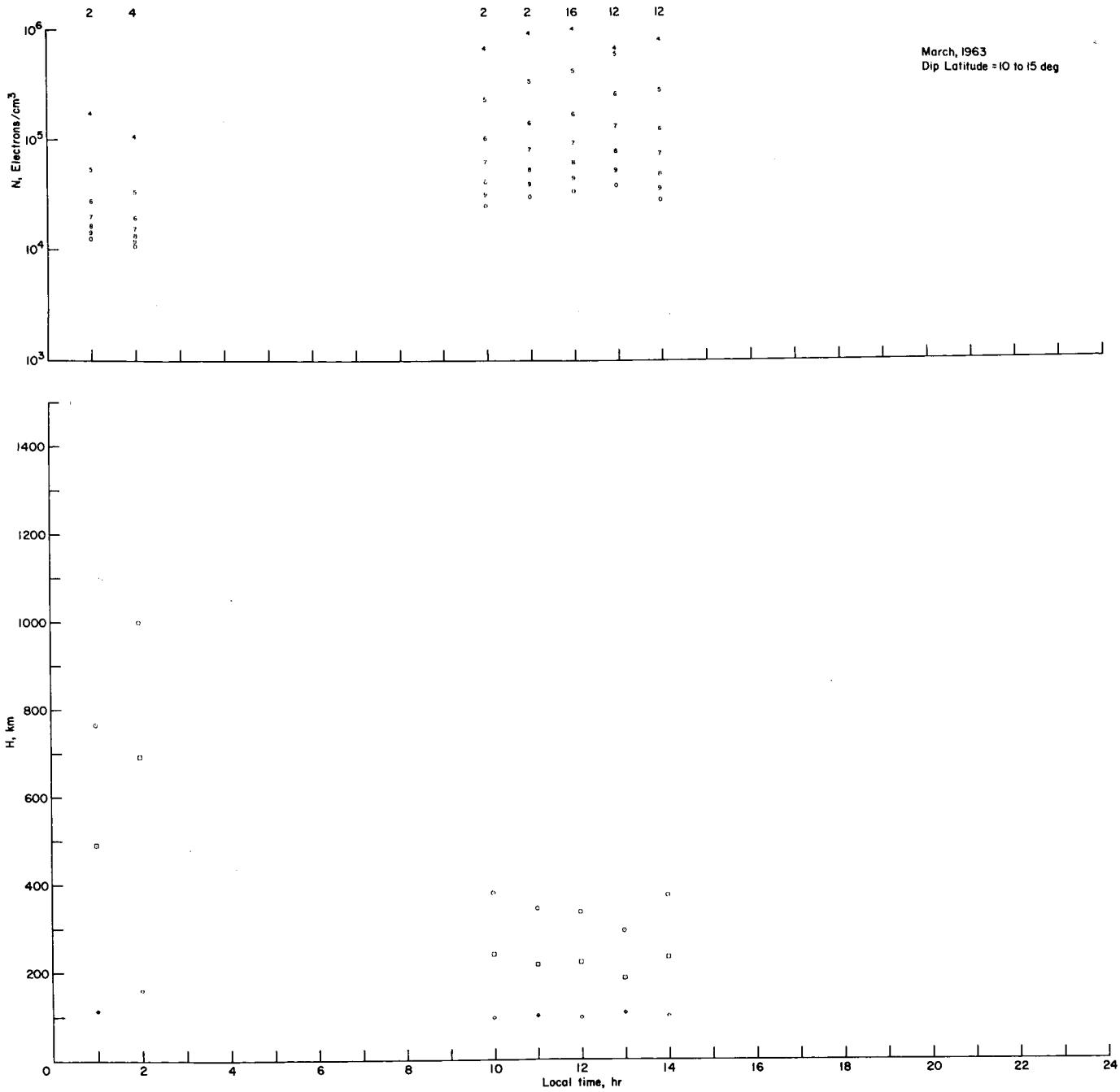

March, 1963
Dip Latitude = 10 to 15 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 264

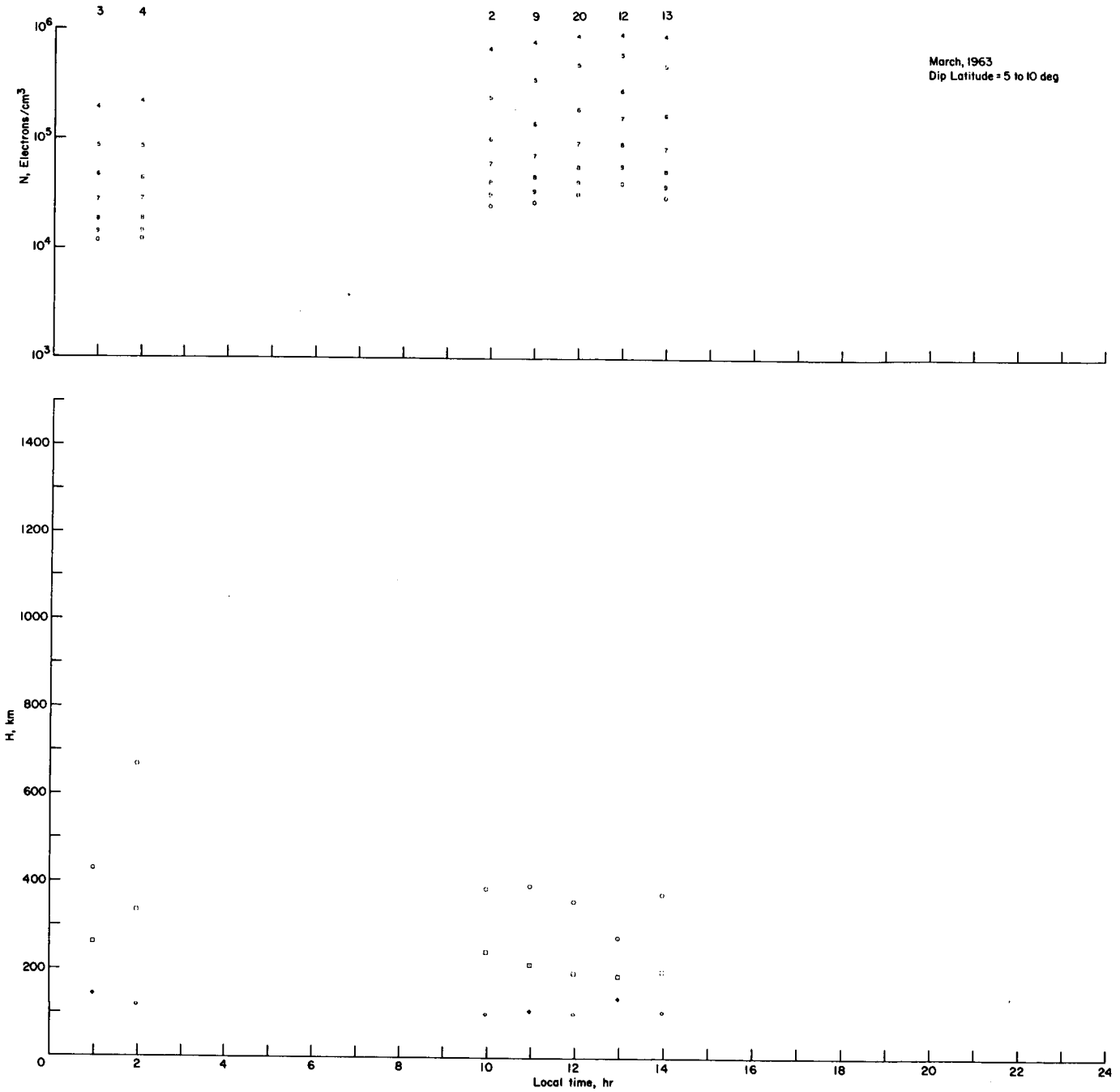

3
4
2
9
20
12
13
March, 1963
Dip Latitude = 5 to 10 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 265

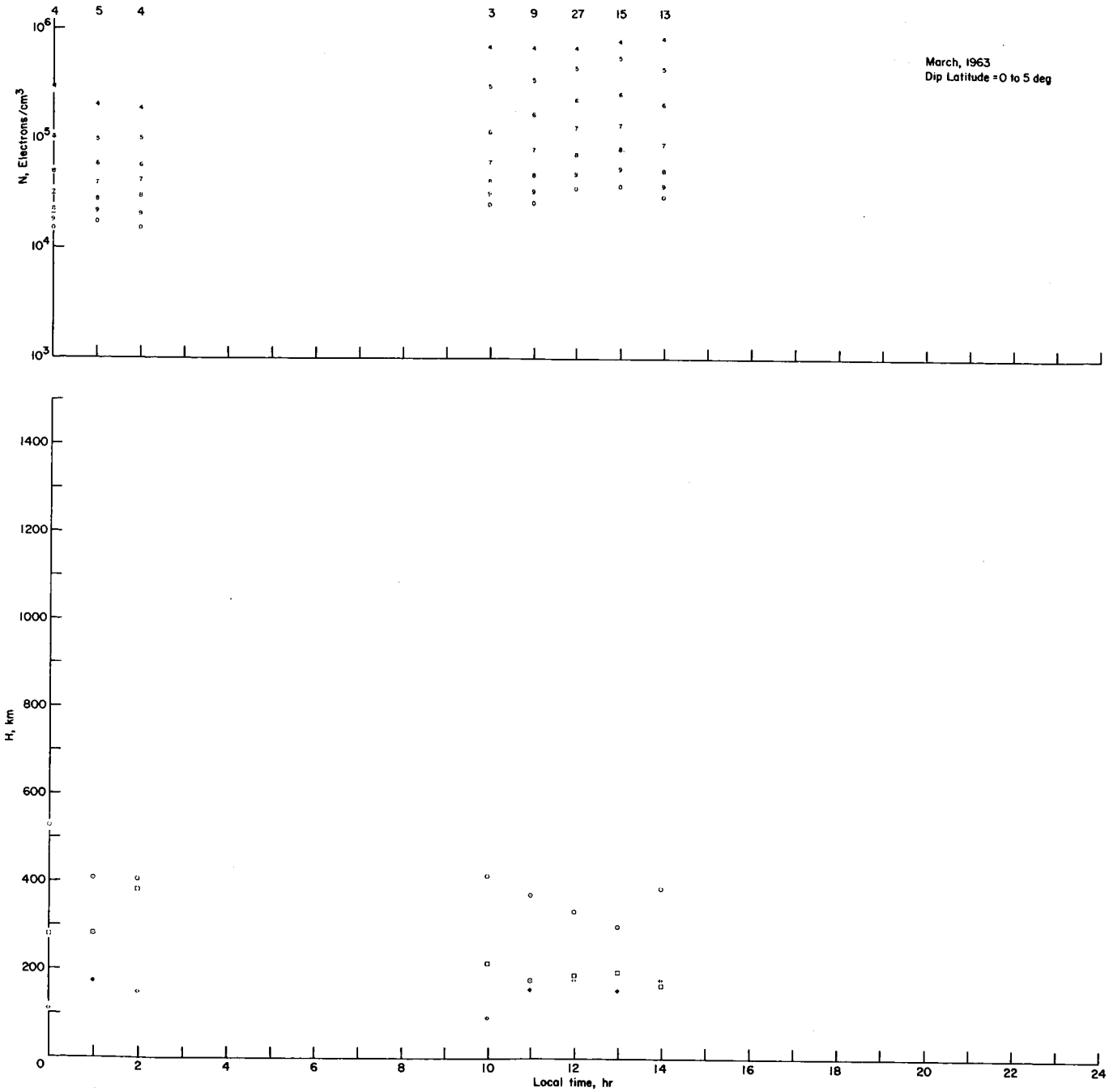

4
5
4
3
9
27
15
13
March, 1963
Dip Latitude =0 to 5 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 266

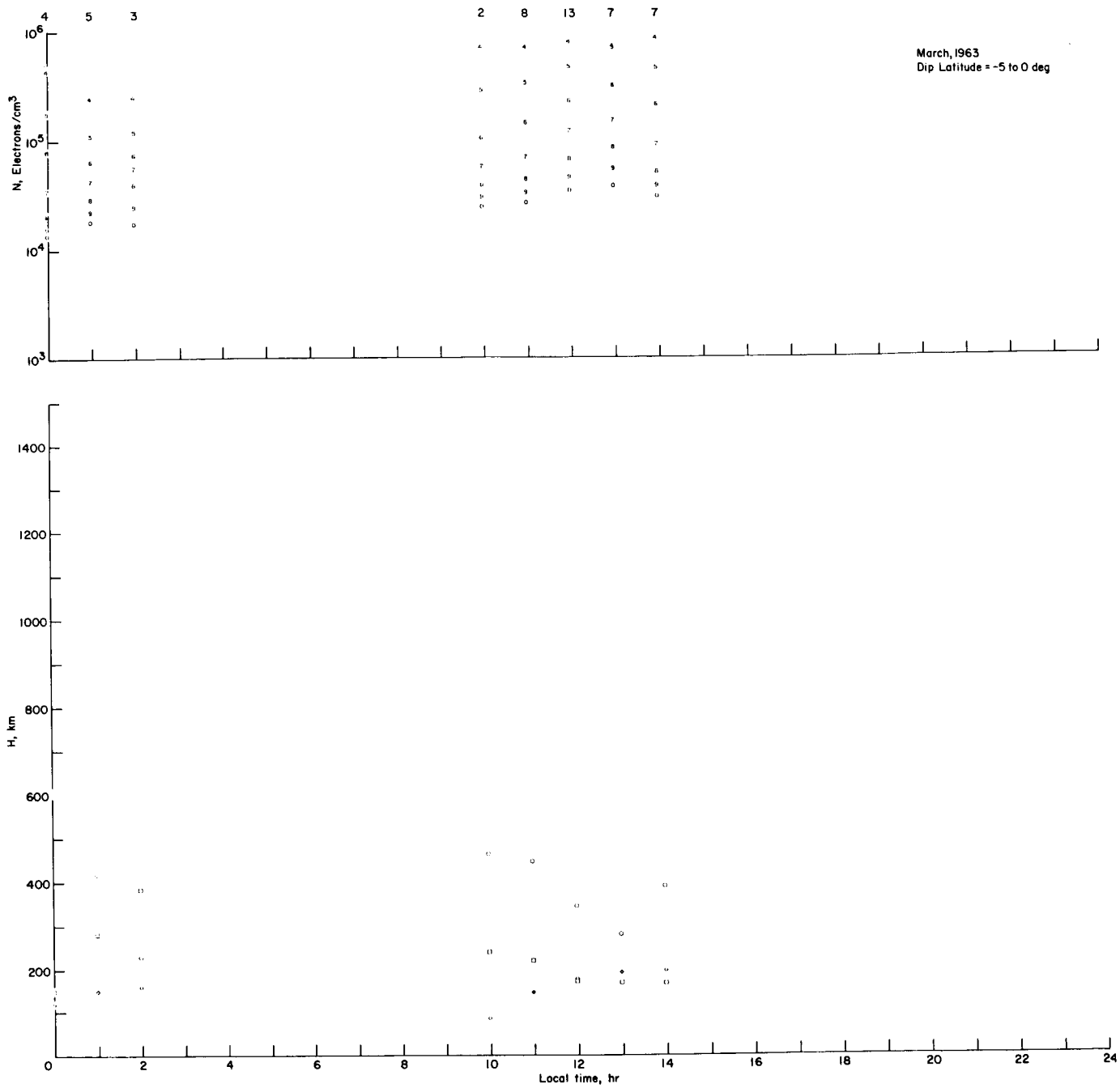

4 5 3
2 8 13 7 7
March, 1963
Dip Latitude = -5 to 0 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0 2 4 6 8 10 12 14 16 18 20 22 24
Local time, hr

Figure 267

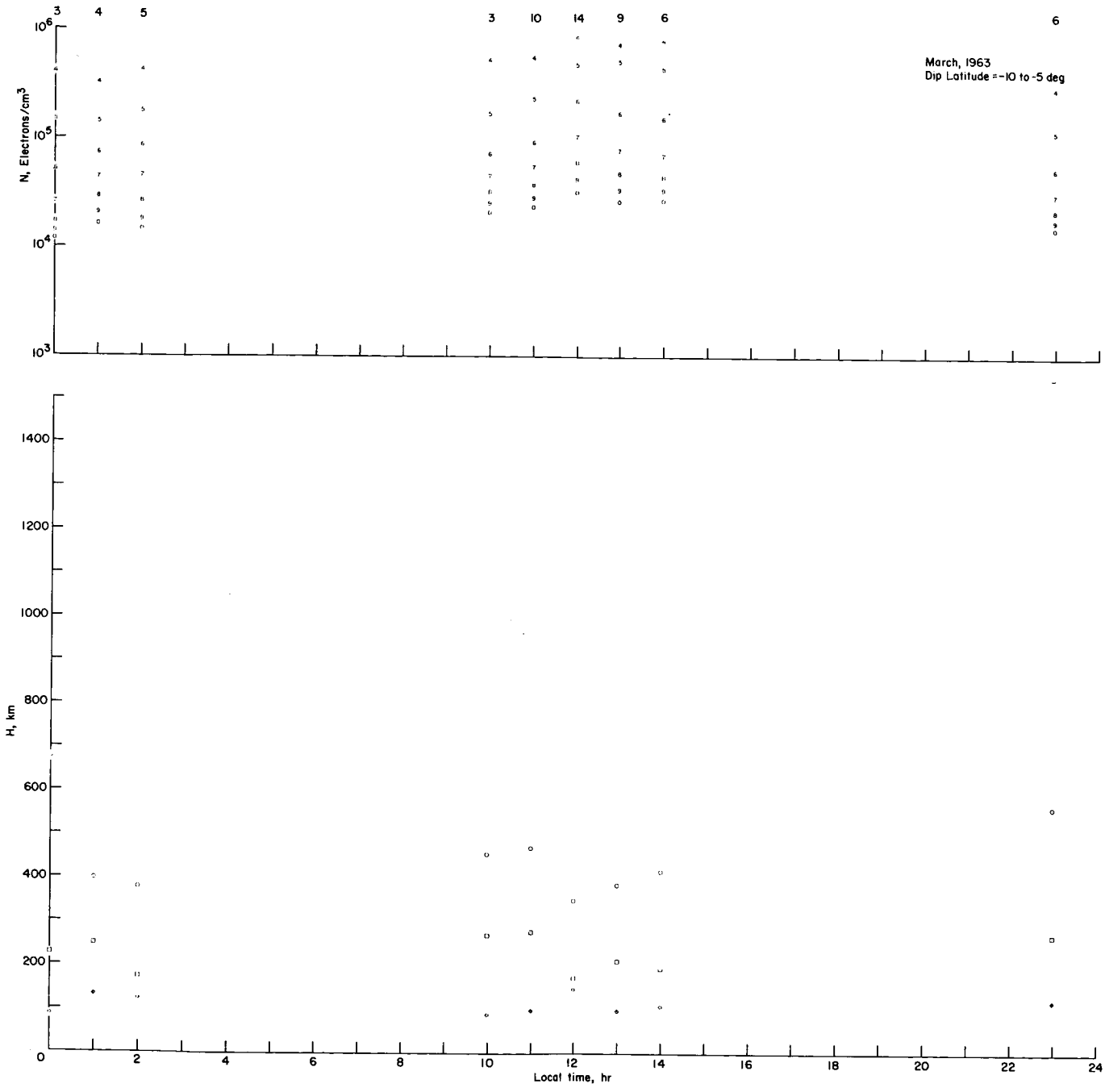

March, 1963
Dip Latitude = -10 to -5 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 268

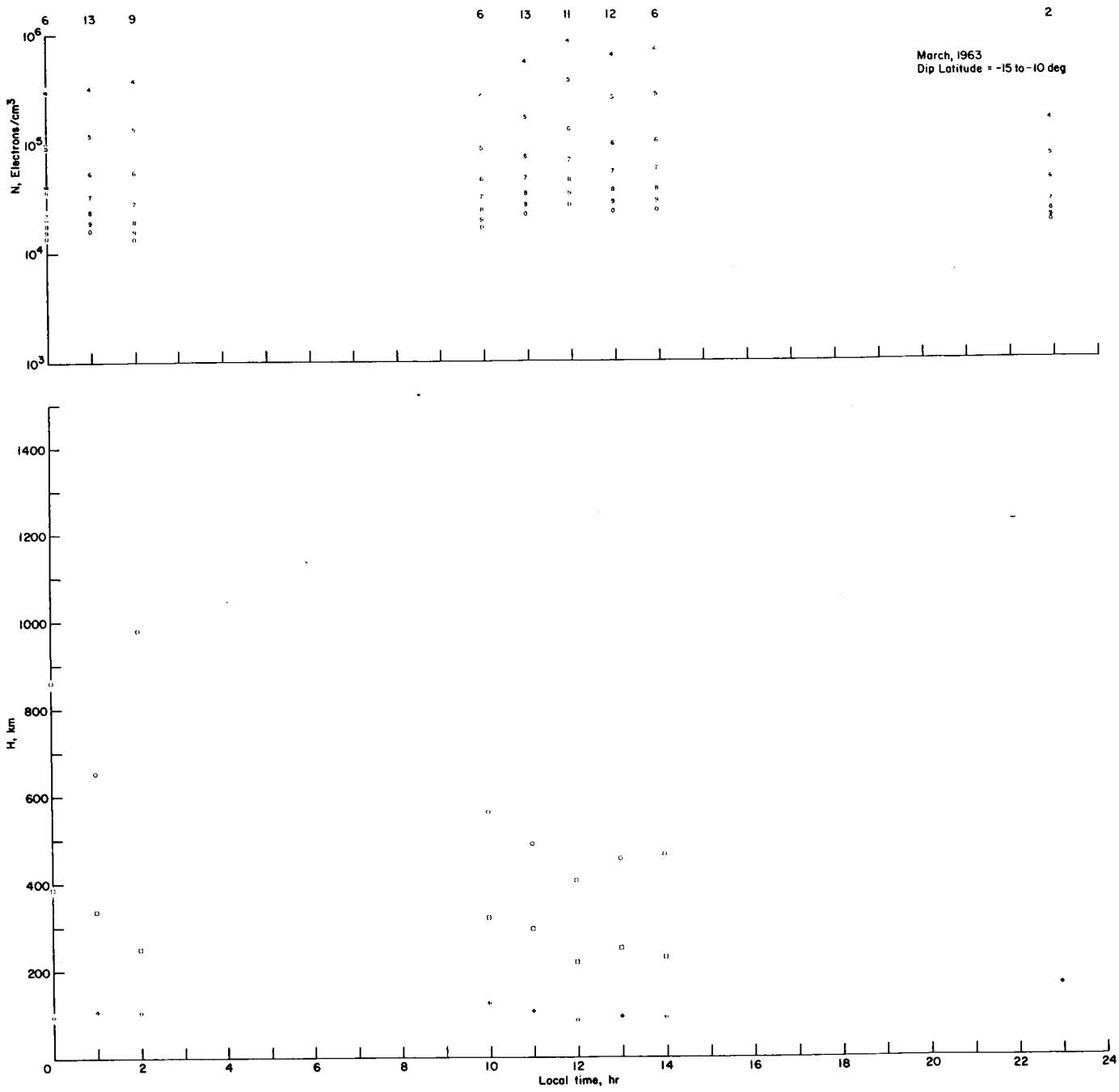

6
13
9
6
13
11
12
6
2
March, 1963
Dip Latitude = -15 to -10 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 269

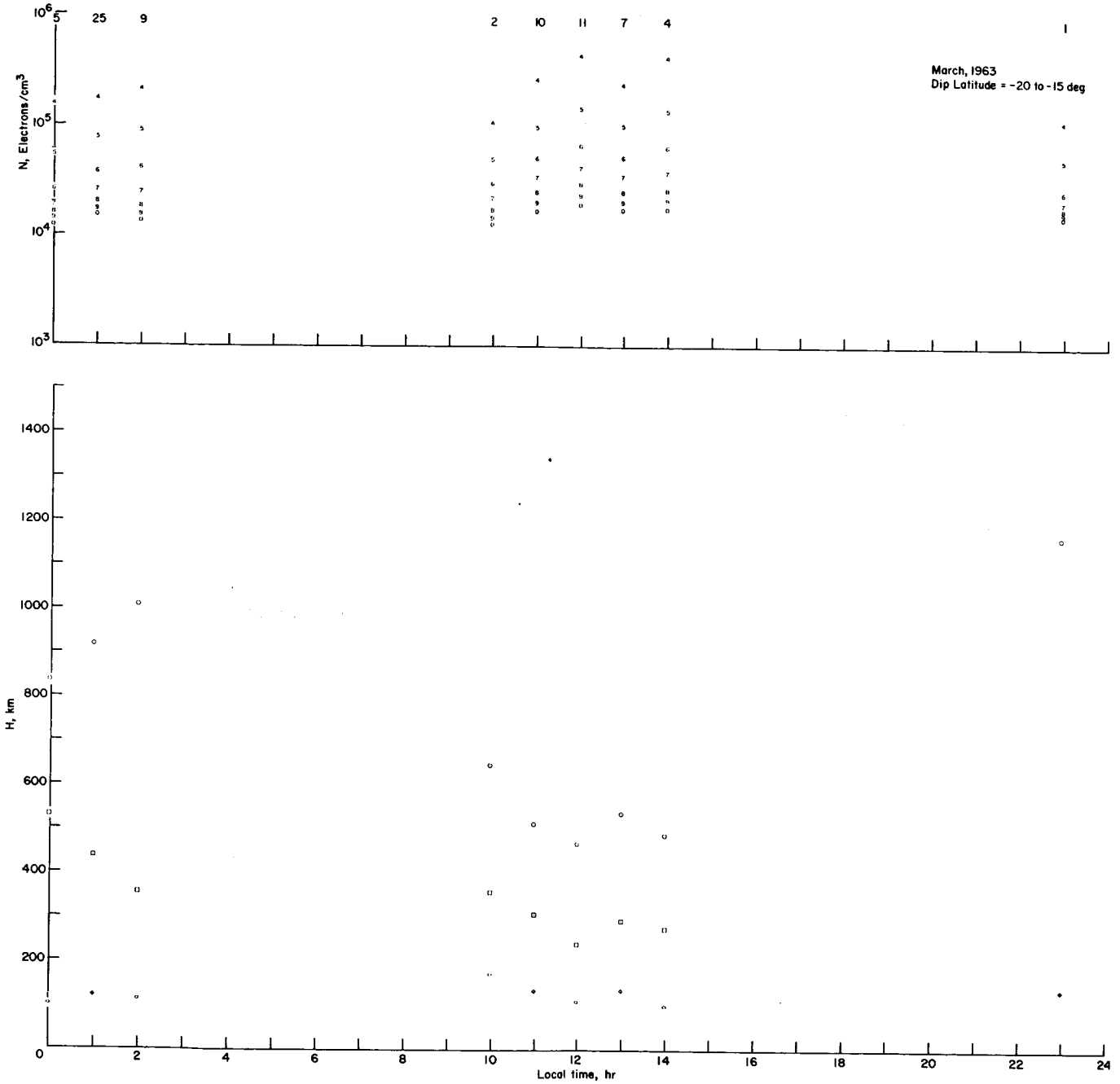

N, Electrons/cm3
10^6
10^5
10^4
10^3
25
9
2
10
11
7
4
1
March, 1963
Dip Latitude = -20 to -15 deg
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 270

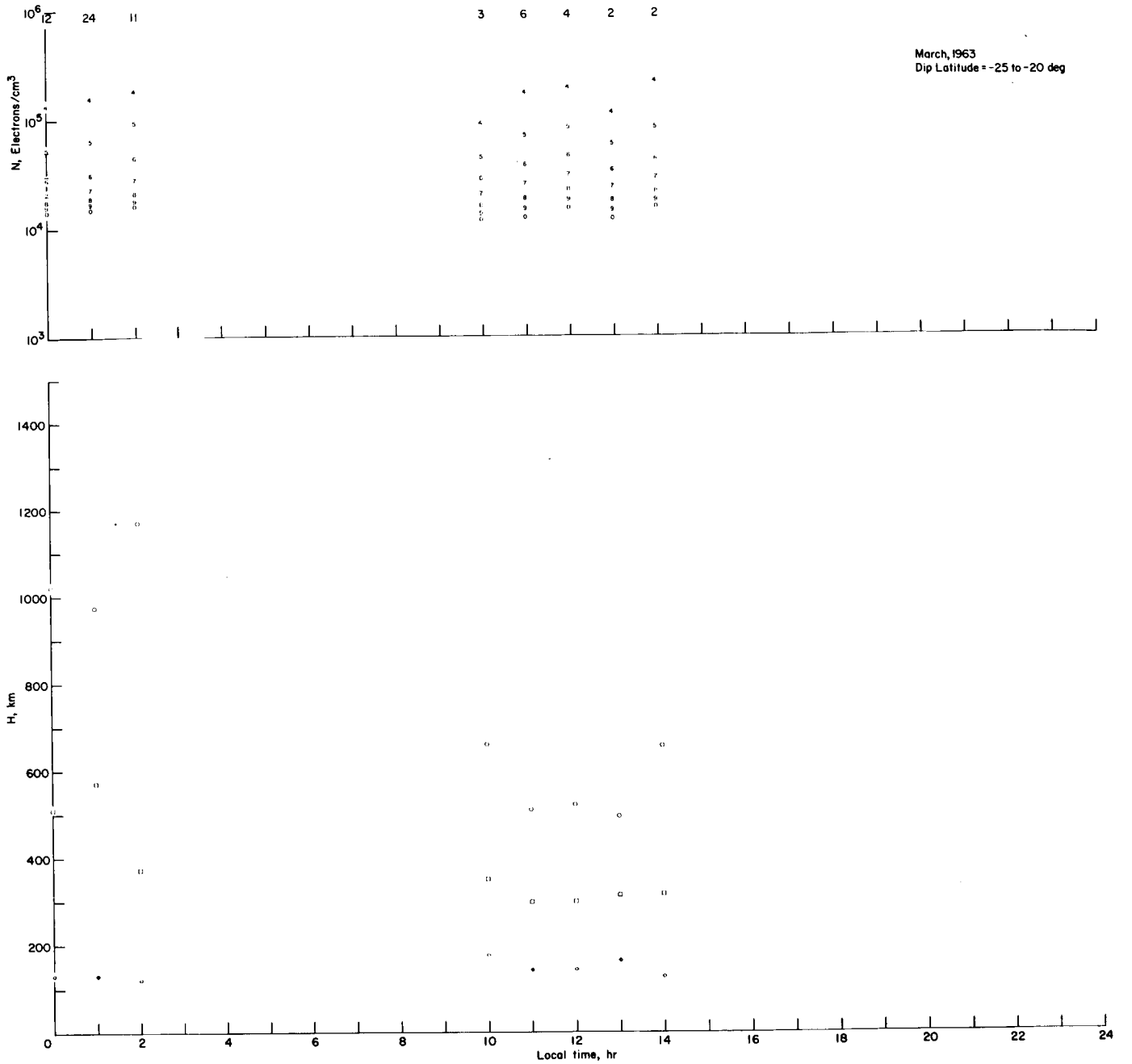

March, 1963
Dip Latitude = -25 to -20 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 271

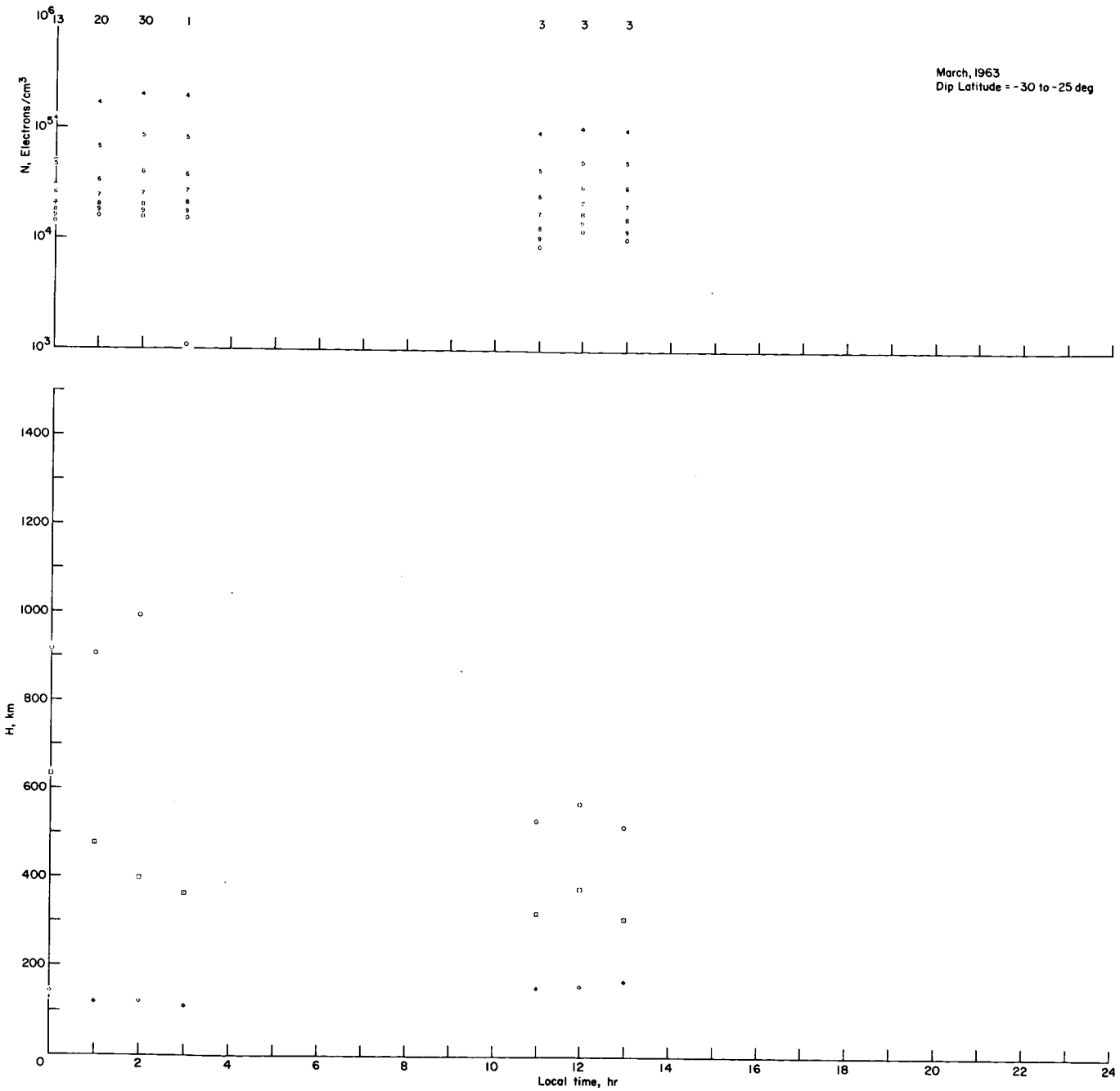

March, 1963
Dip Latitude = -30 to -25 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 272

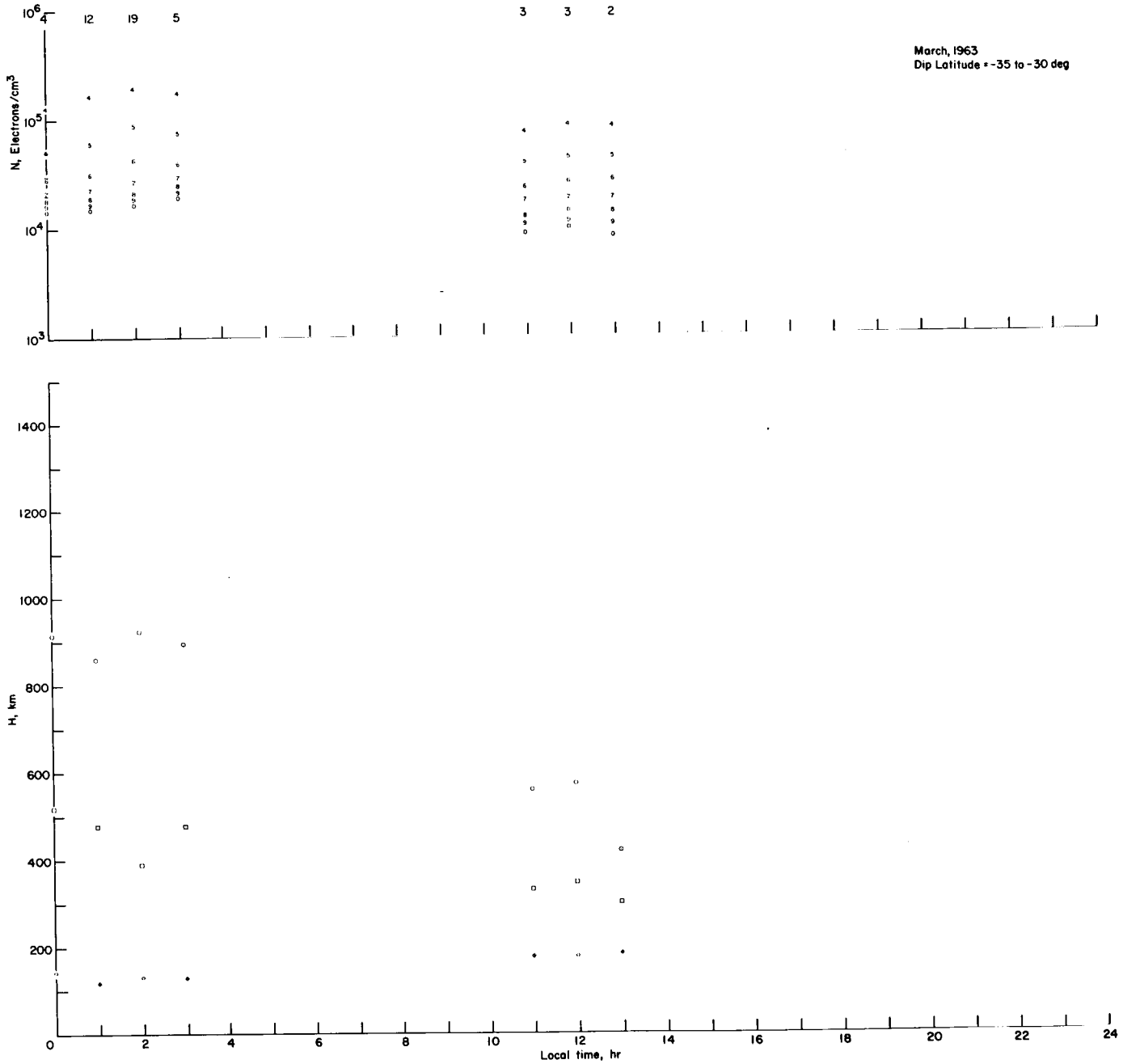

March, 1963
Dip Latitude = -35 to -30 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 273

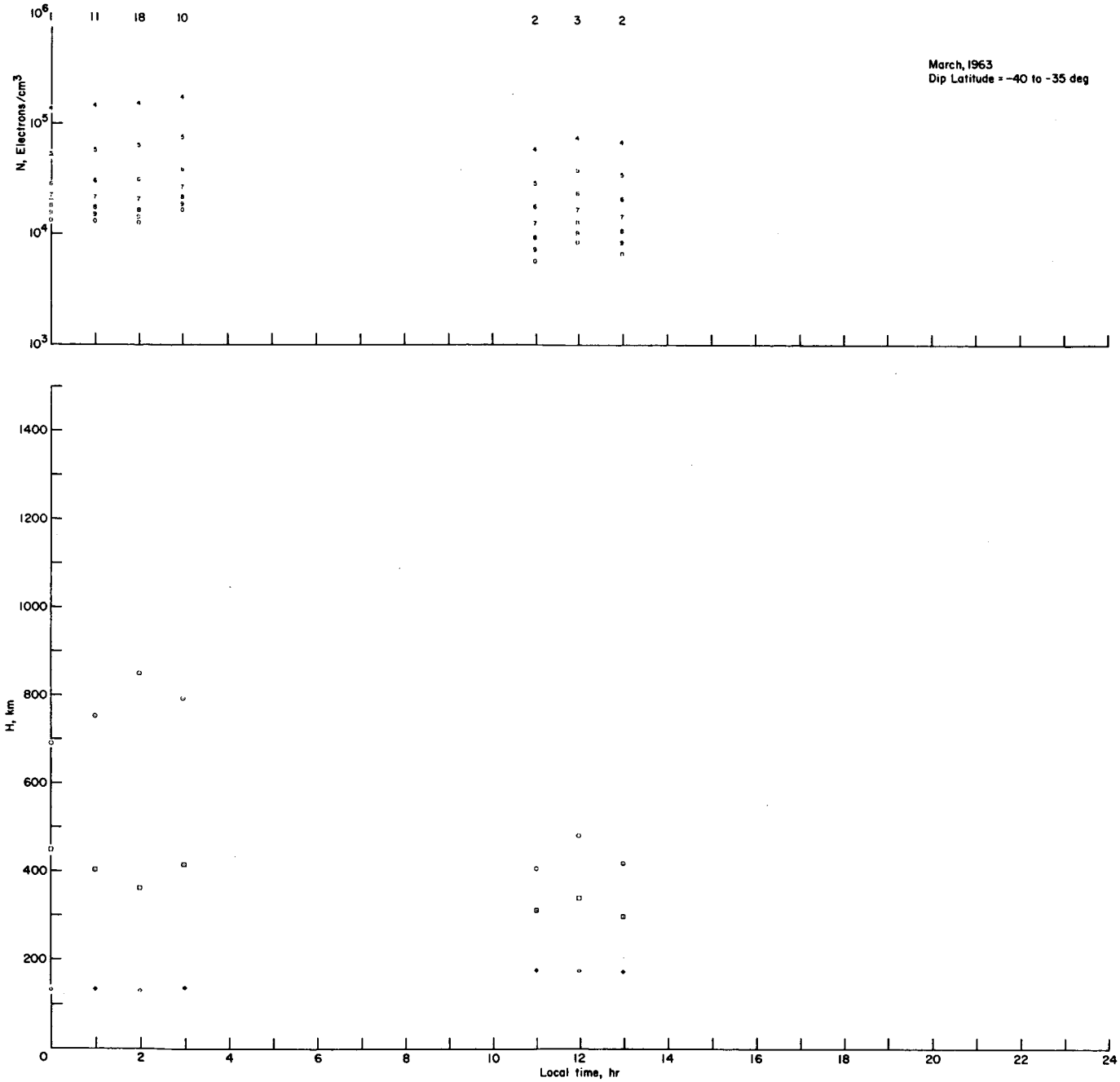

11
18
10
2
3
2
March, 1963
Dip Latitude = −40 to −35 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 274

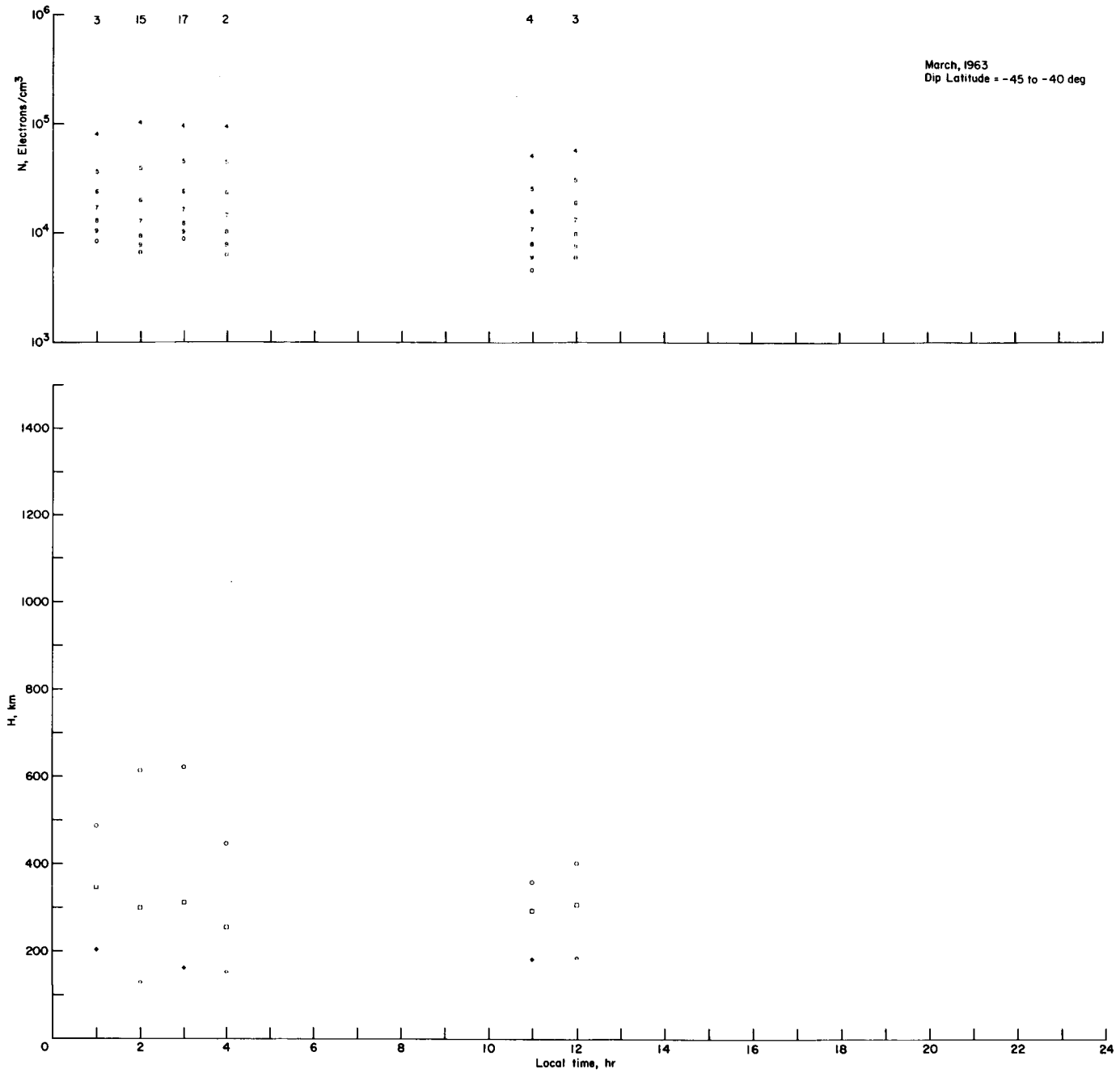

March, 1963
Dip Latitude = -45 to -40 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 275

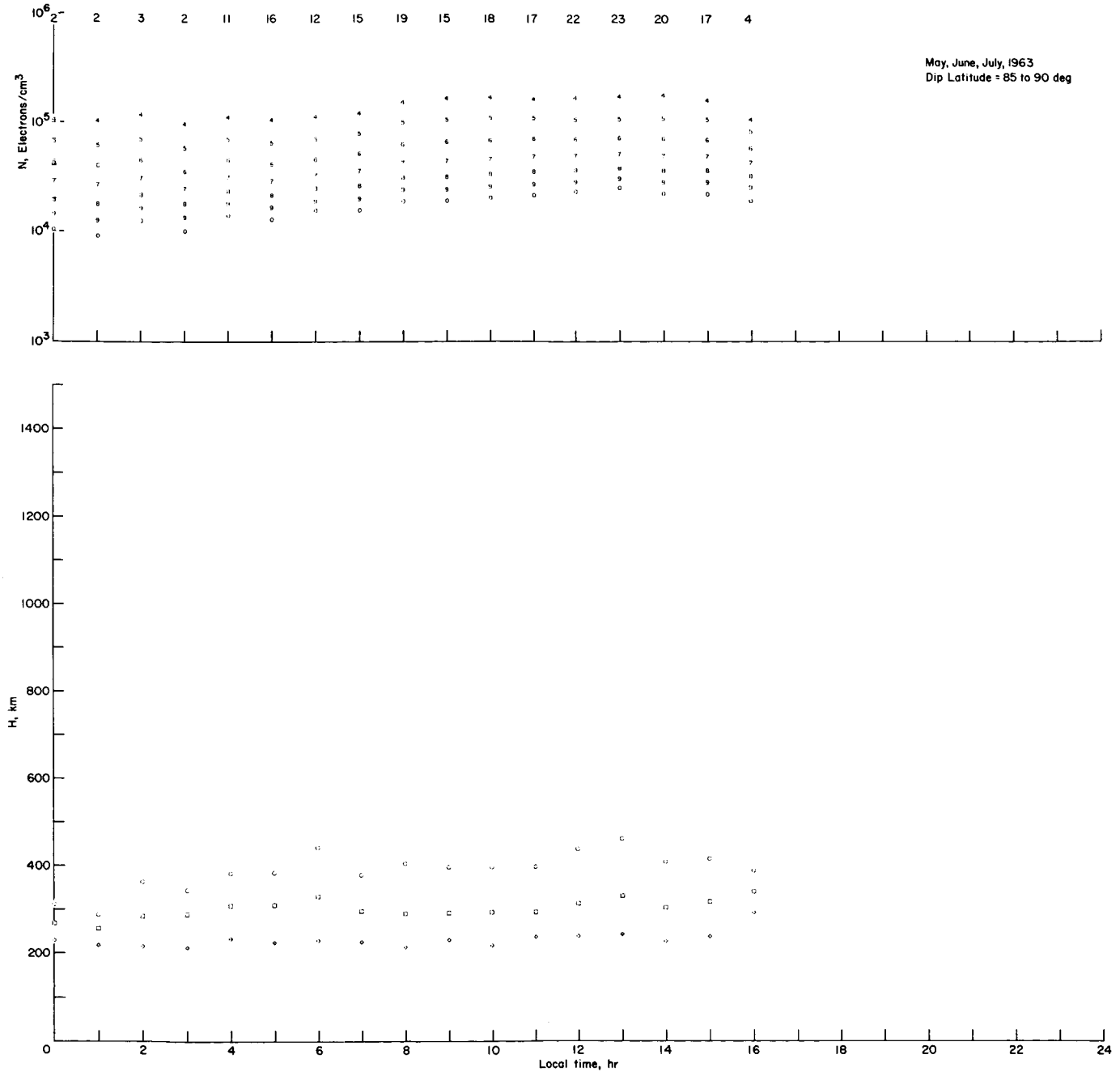

2 3 2 11 16 12 15 19 15 18 17 22 23 20 17 4
May, June, July, 1963
Dip Latitude = 85 to 90 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 276

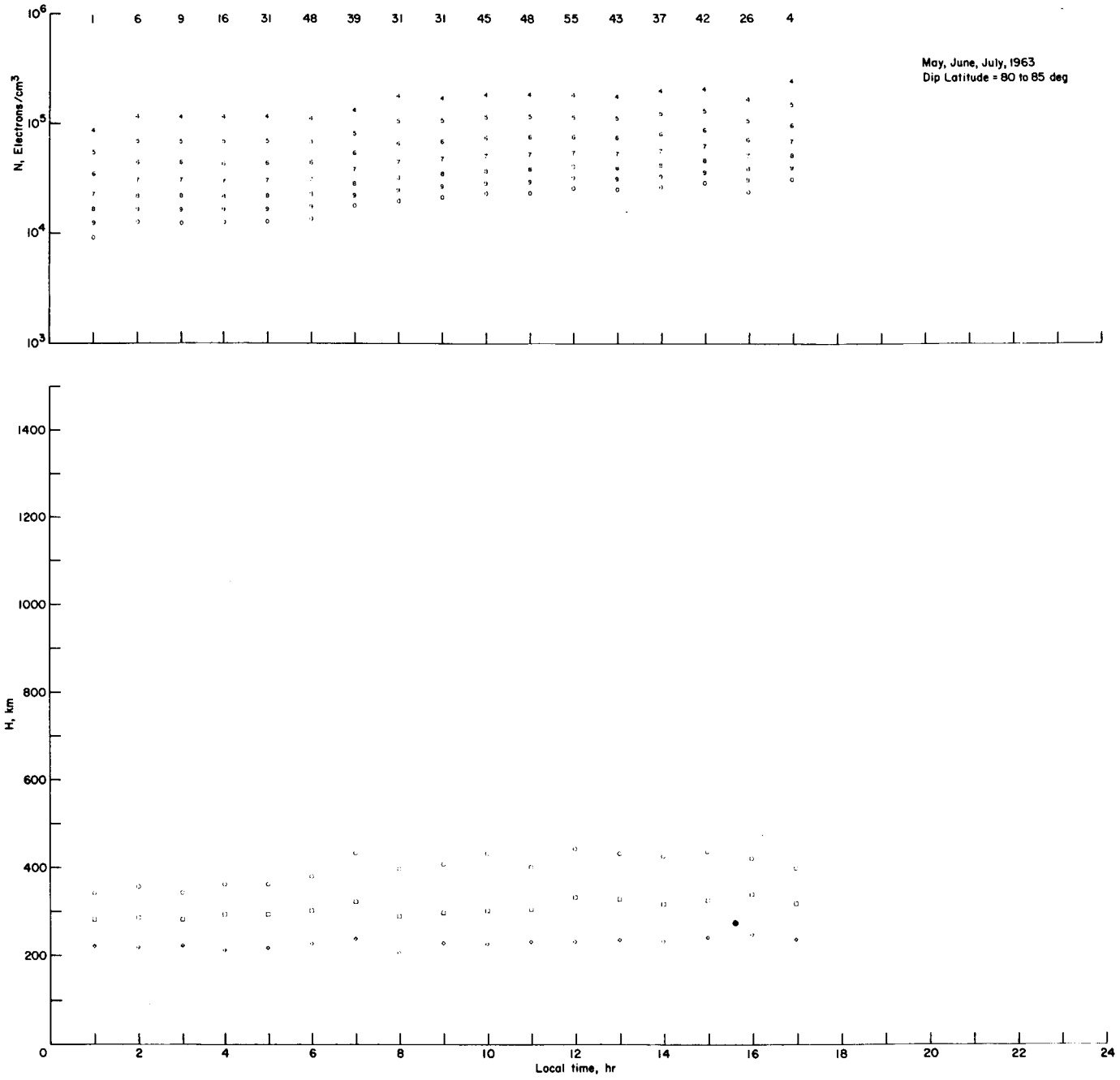

1 6 9 16 31 48 39 31 31 45 48 55 43 37 42 26 4
May, June, July, 1963
Dip Latitude = 80 to 85 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 277

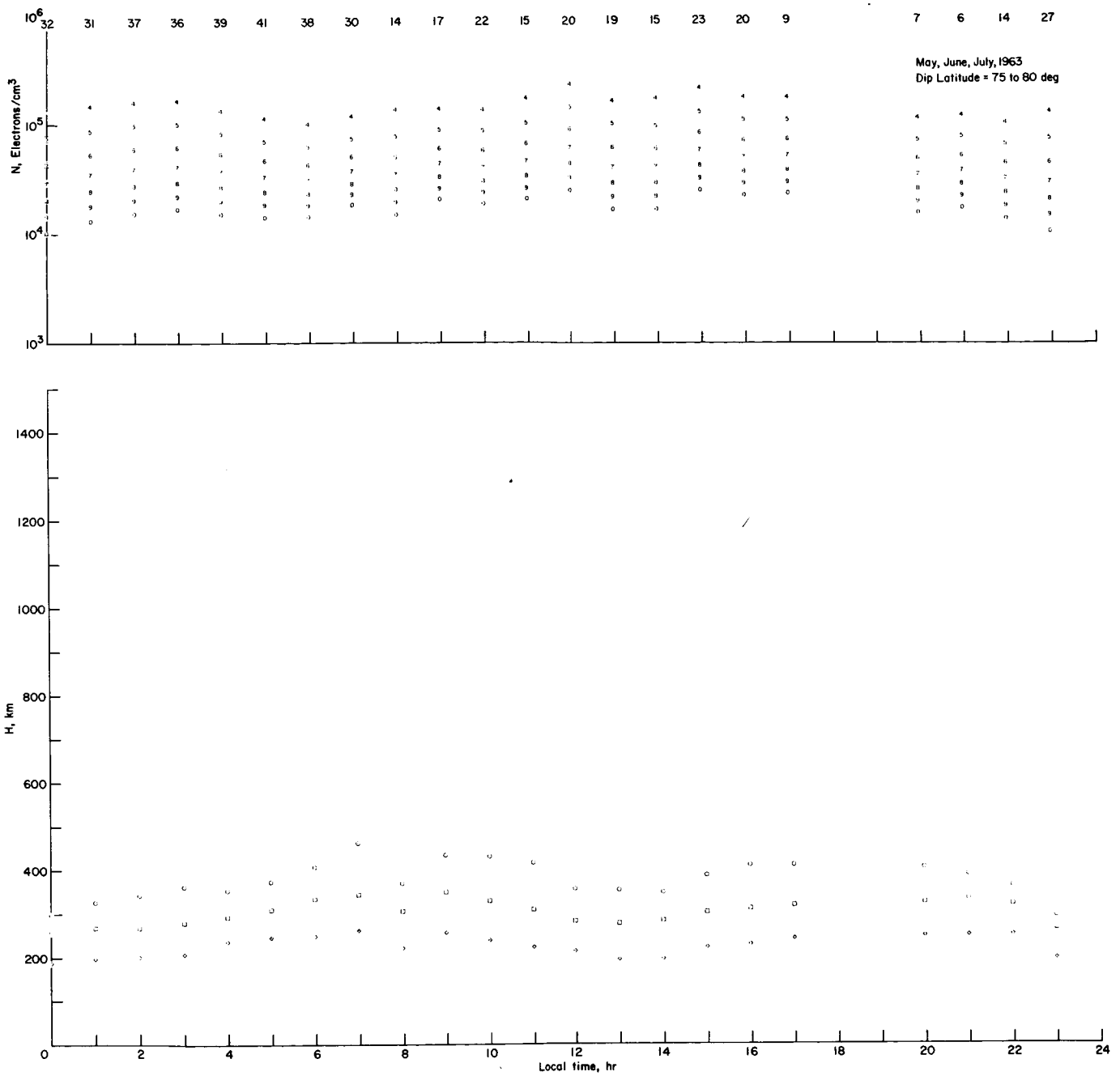

32 31 37 36 39 41 38 30 14 17 22 15 20 19 15 23 20 9 7 6 14 27
May, June, July, 1963
Dip Latitude = 75 to 80 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 278

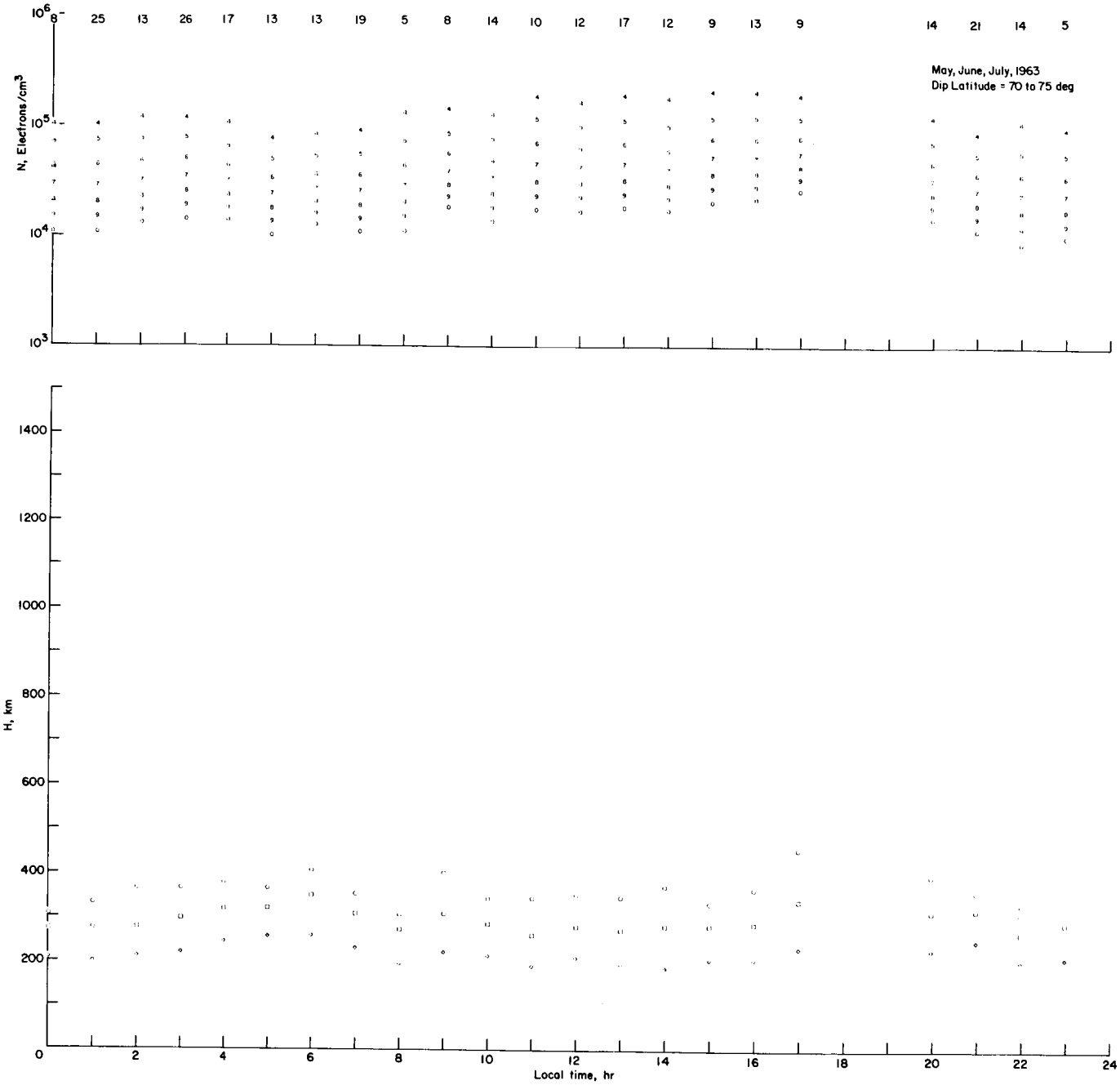

25 13 26 17 13 13 19 5 8 14 10 12 17 12 9 13 9
14 21 14 5
May, June, July, 1963
Dip Latitude = 70 to 75 deg
N, Electrons/cm³
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2 4 6 8 10 12 14 16 18 20 22 24
Local time, hr

Figure 279

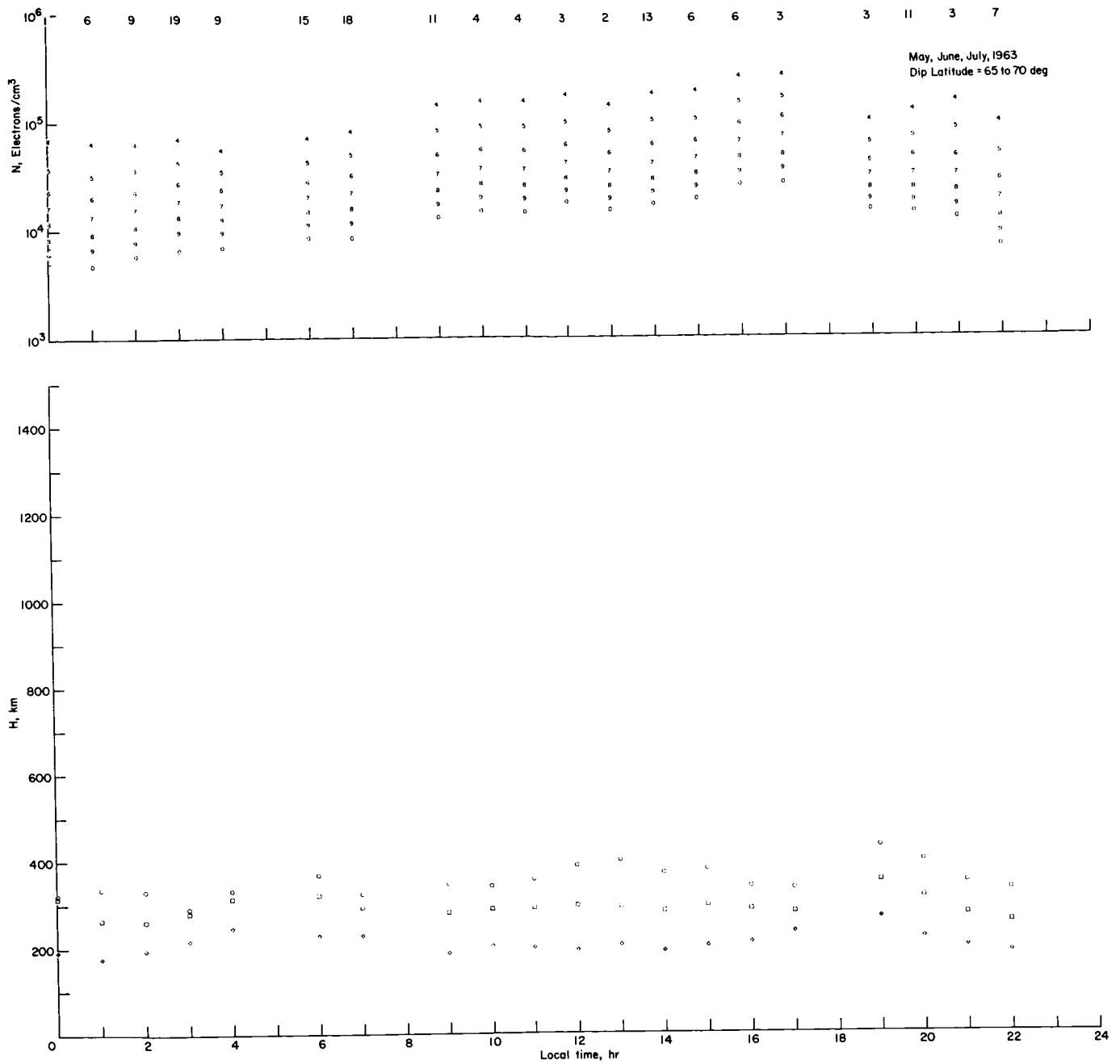

6 9 19 9 15 18 11 4 4 3 2 13 6 6 3 3 11 3 7
May, June, July, 1963
Dip Latitude = 65 to 70 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 280

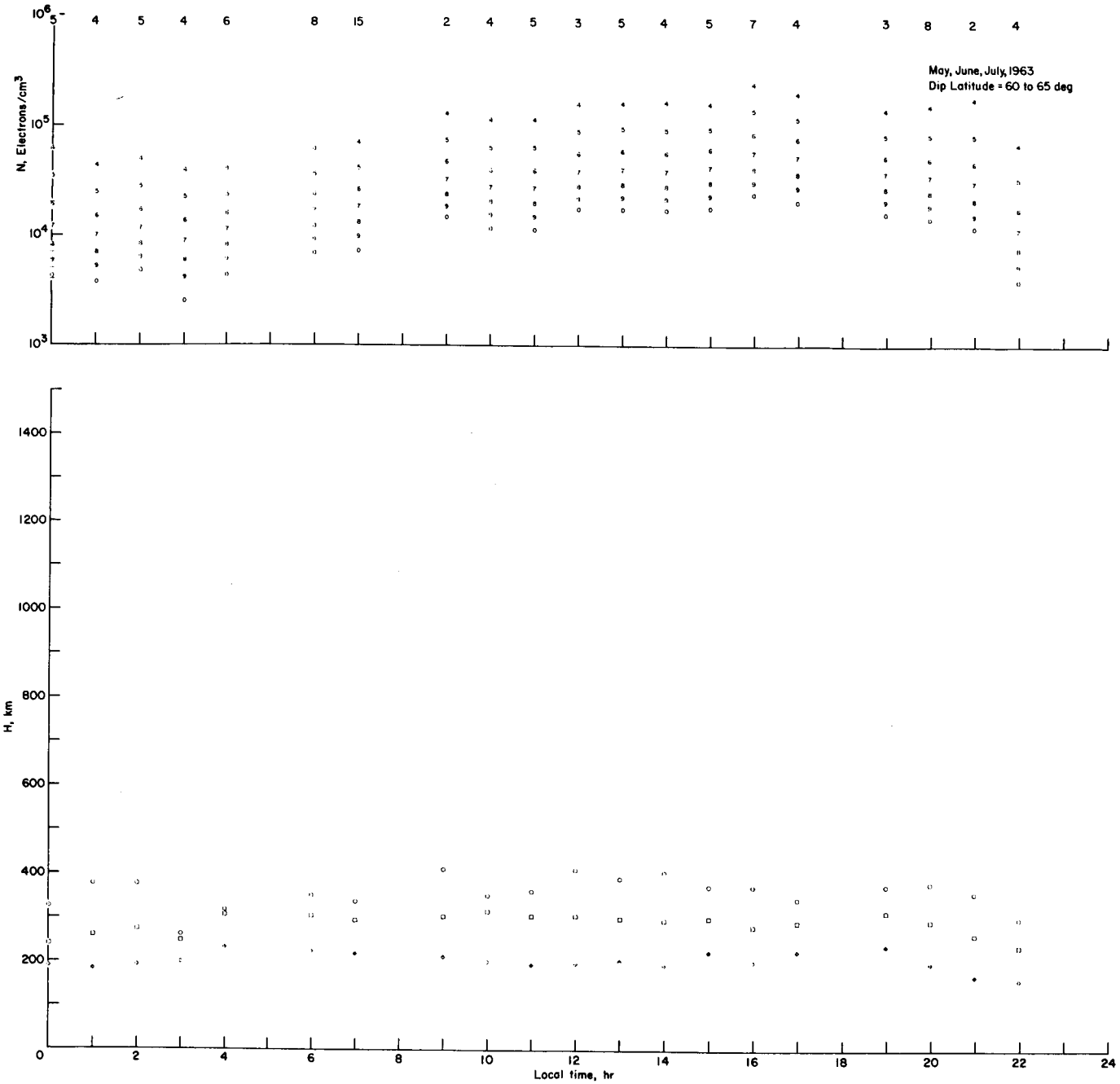

May, June, July, 1963
Dip Latitude = 60 to 65 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 281

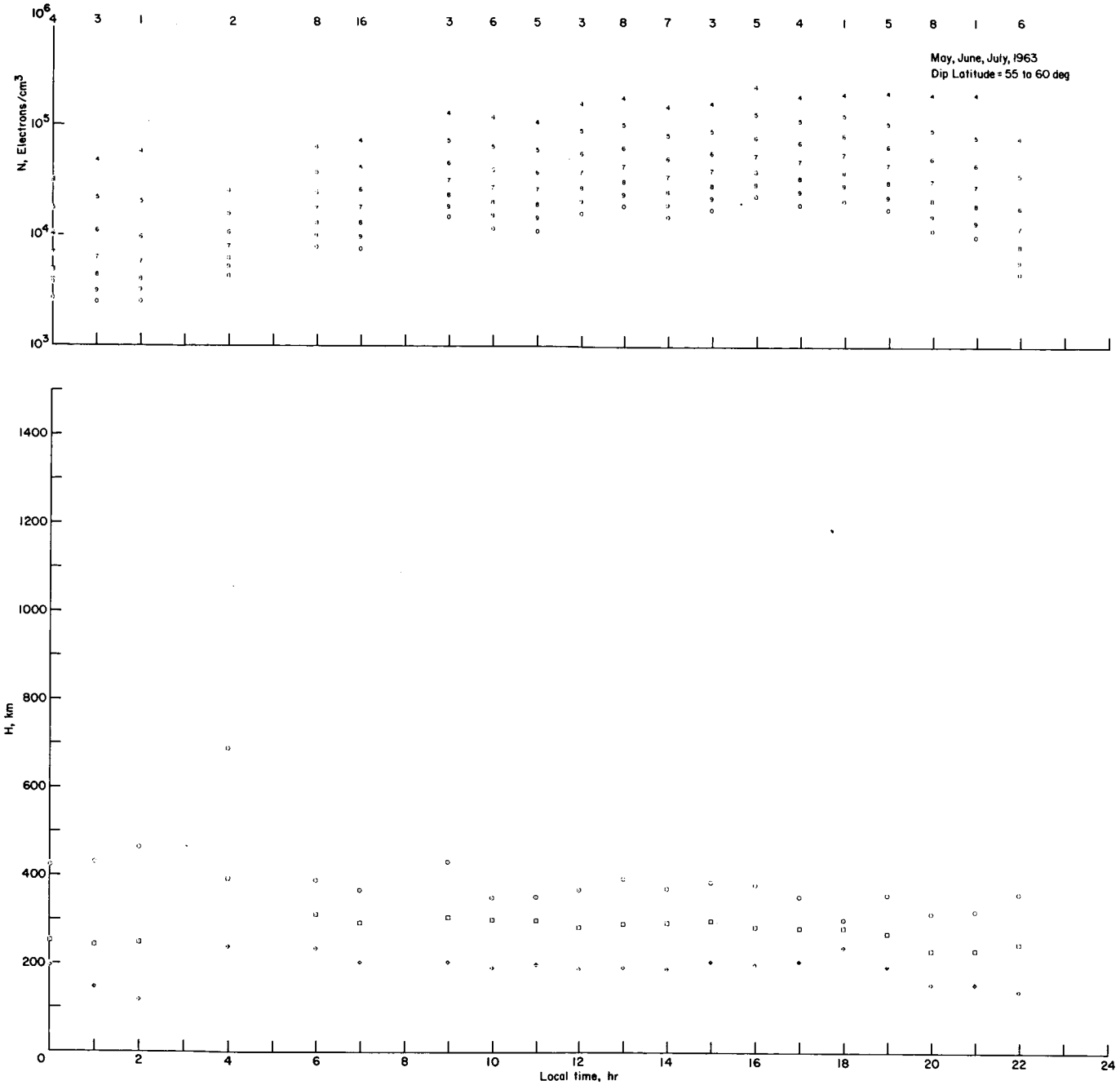

May, June, July, 1963
Dip Latitude = 55 to 60 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 282

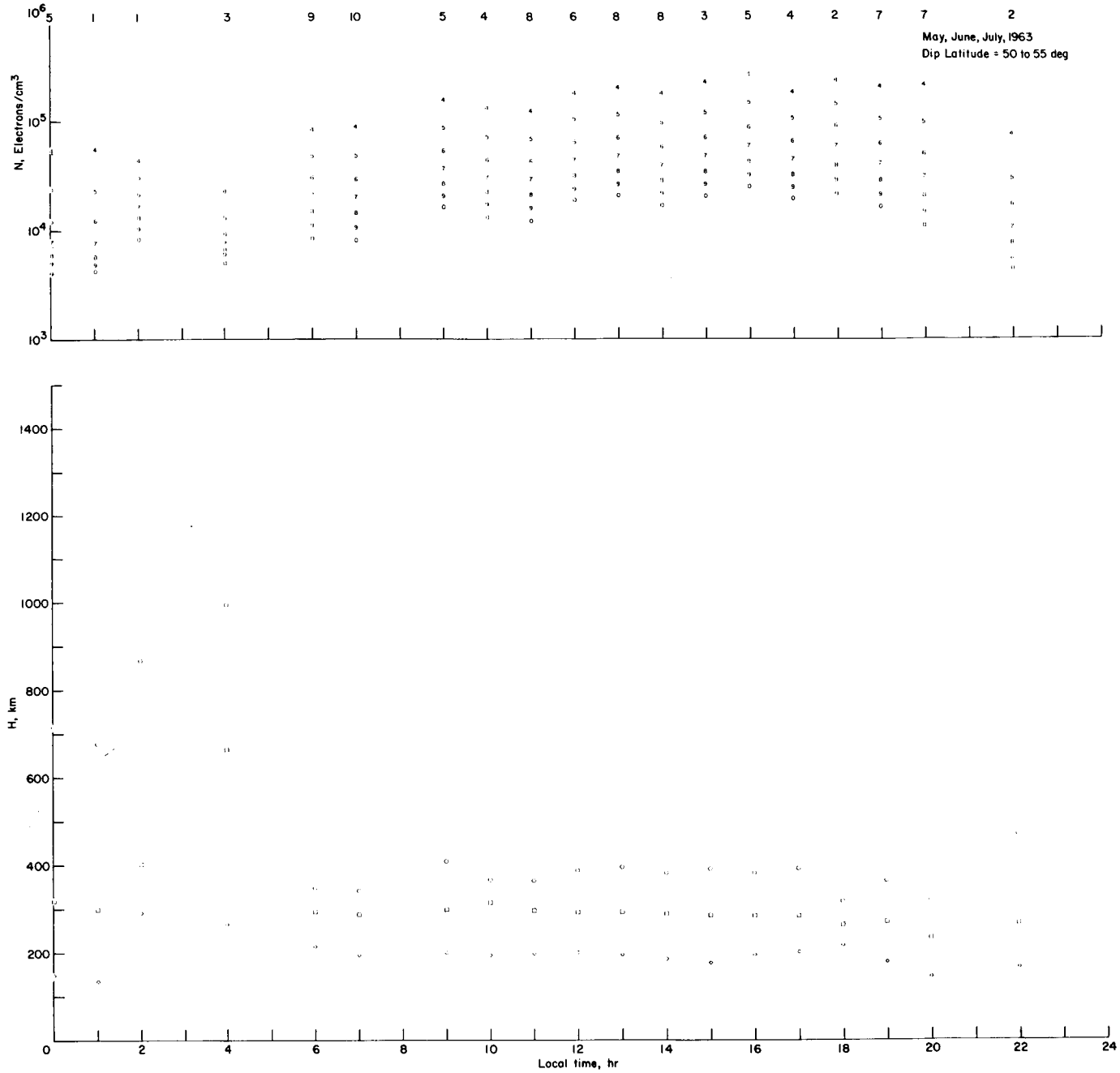

May, June, July, 1963
Dip Latitude = 50 to 55 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 283

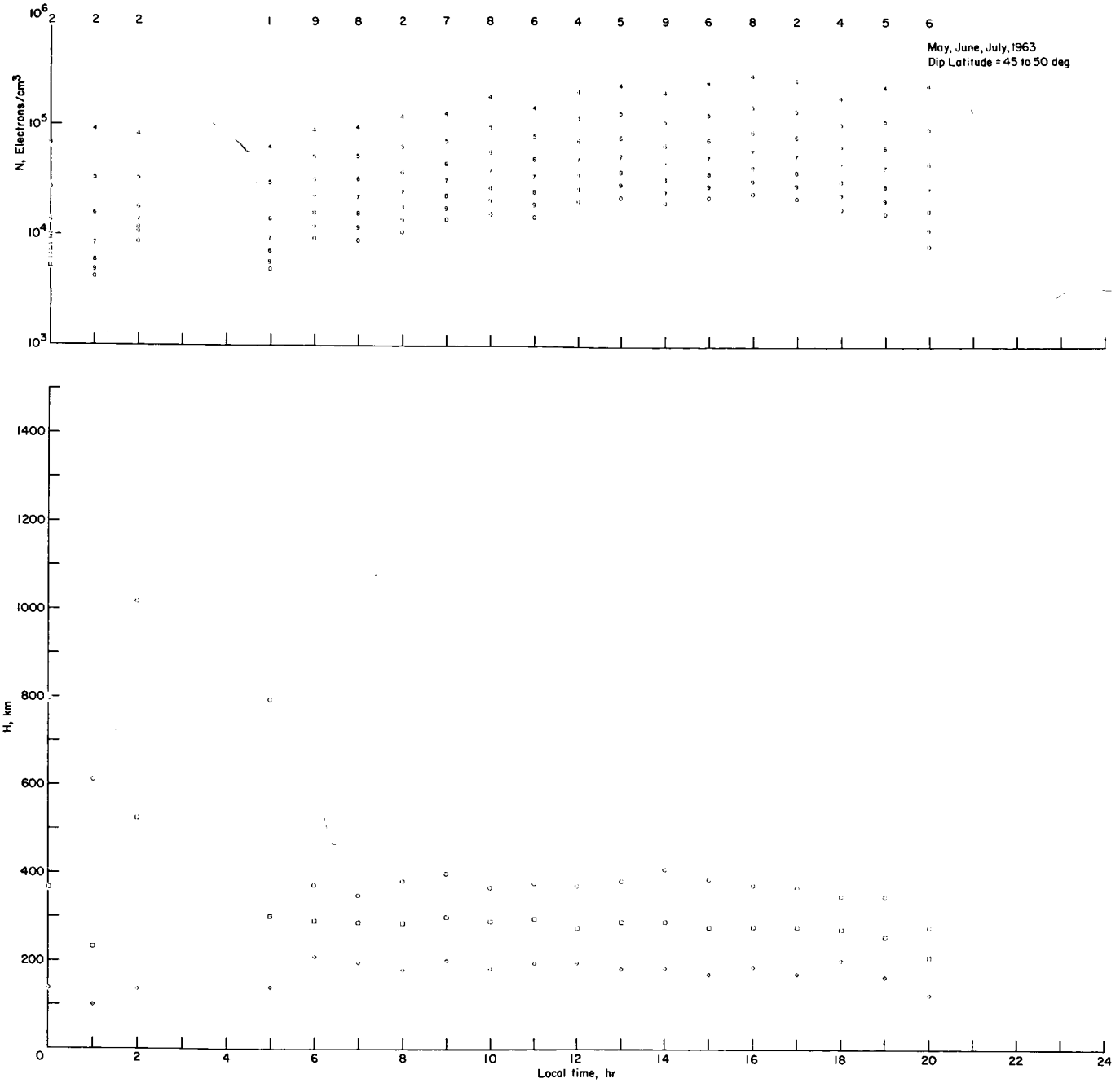

May, June, July, 1963
Dip Latitude = 45 to 50 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 284

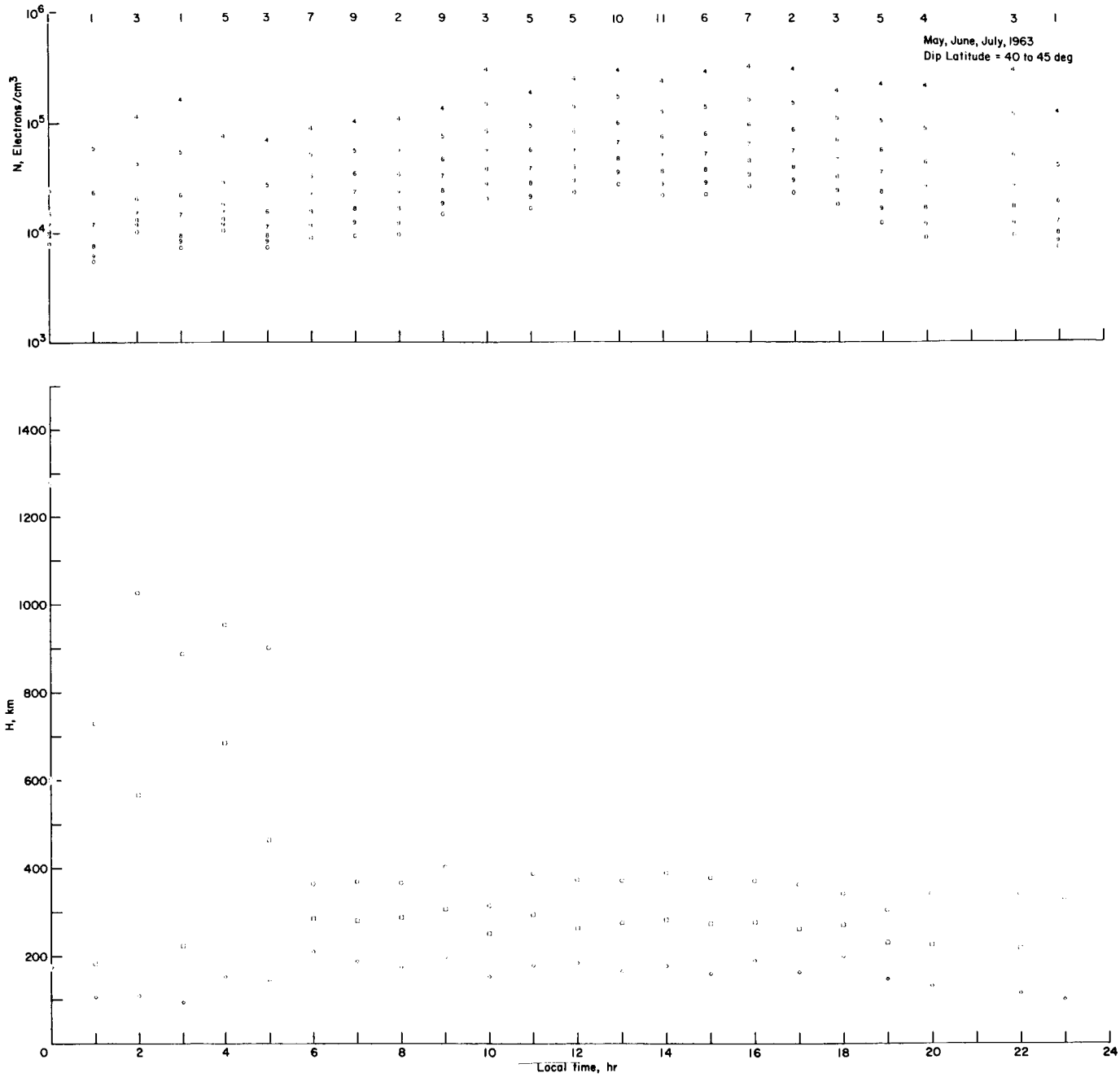

May, June, July, 1963
Dip Latitude = 40 to 45 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 285

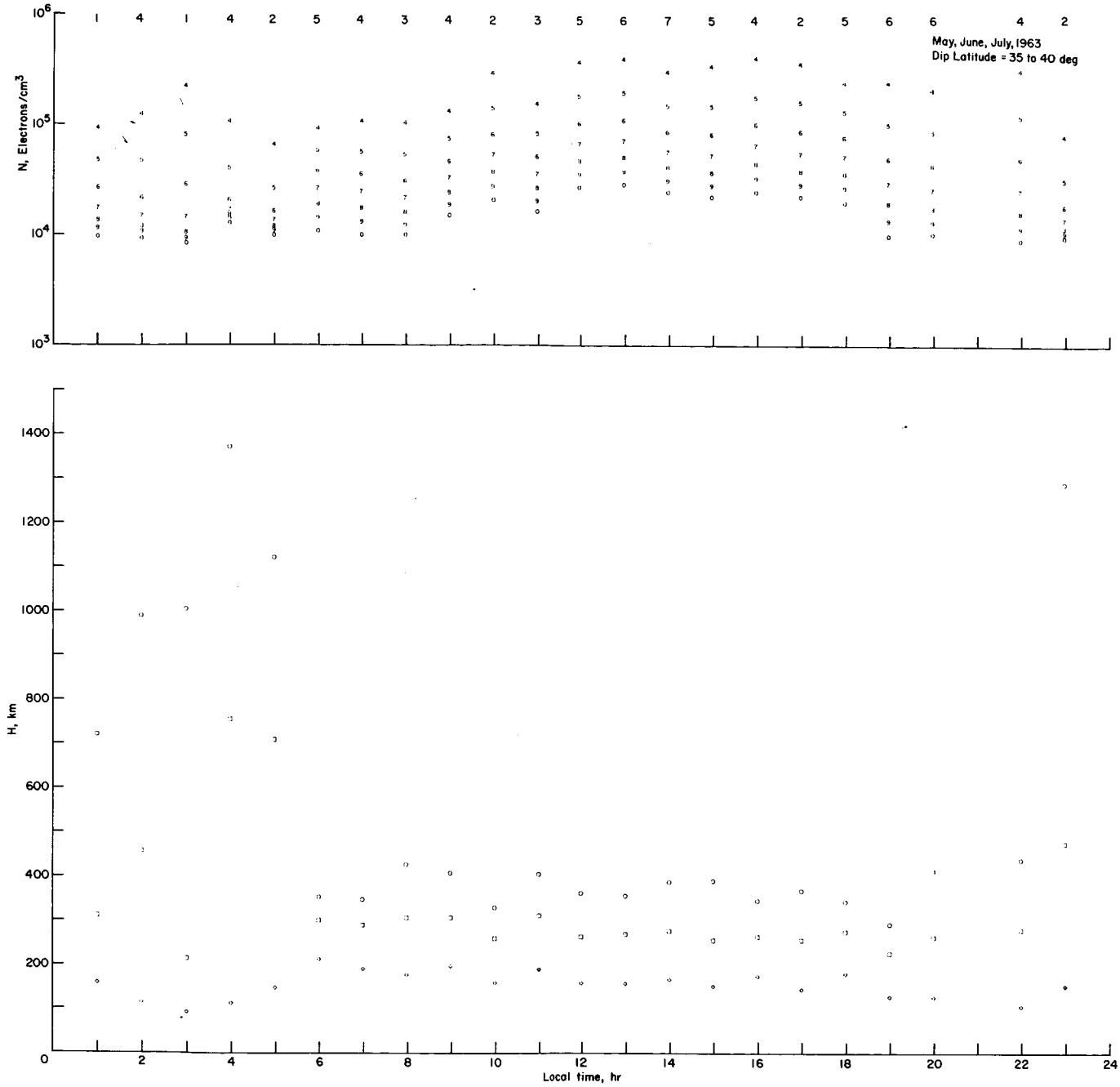

May, June, July, 1963
Dip Latitude = 35 to 40 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 286

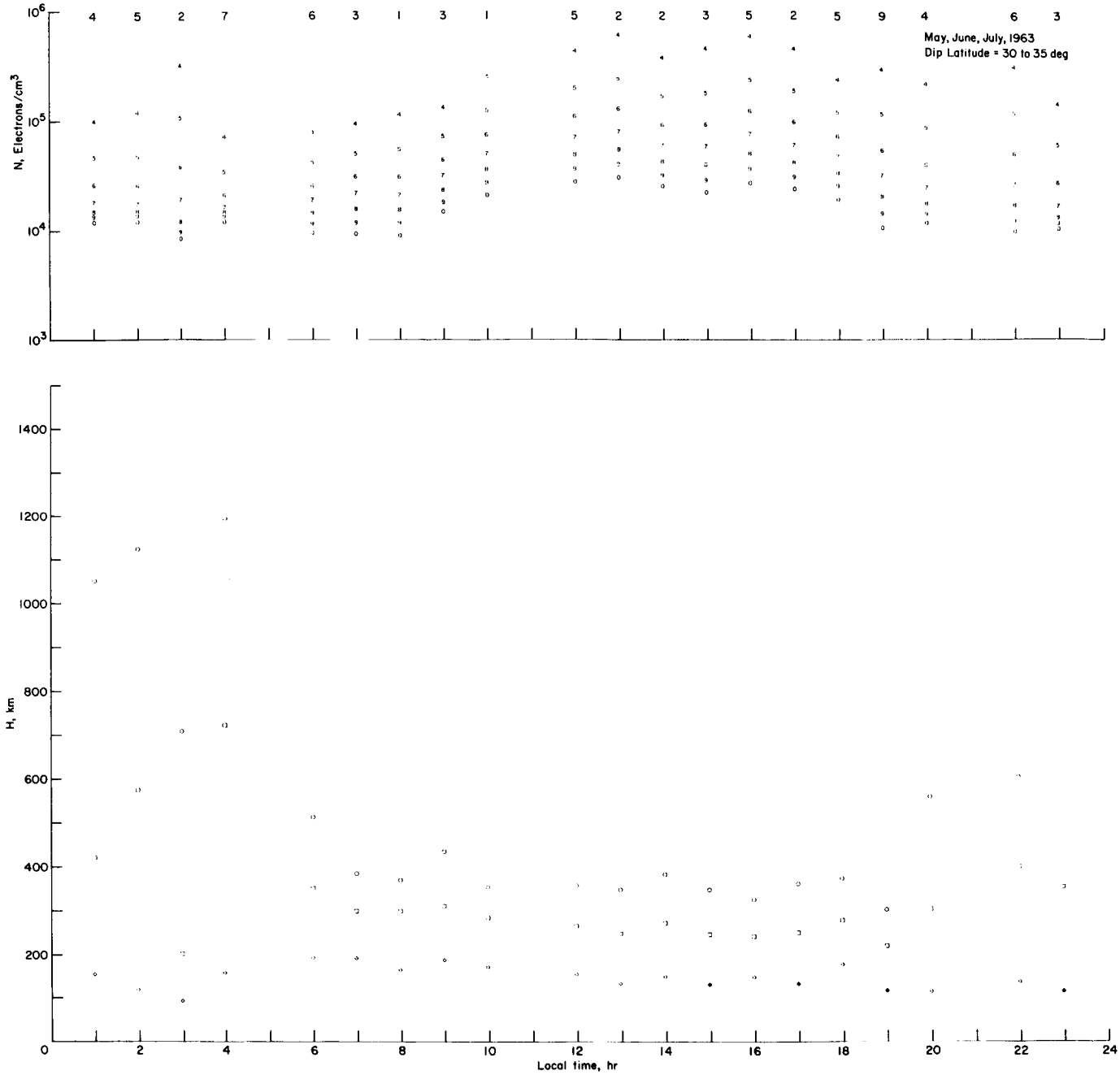

May, June, July, 1963
Dip Latitude = 30 to 35 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 287

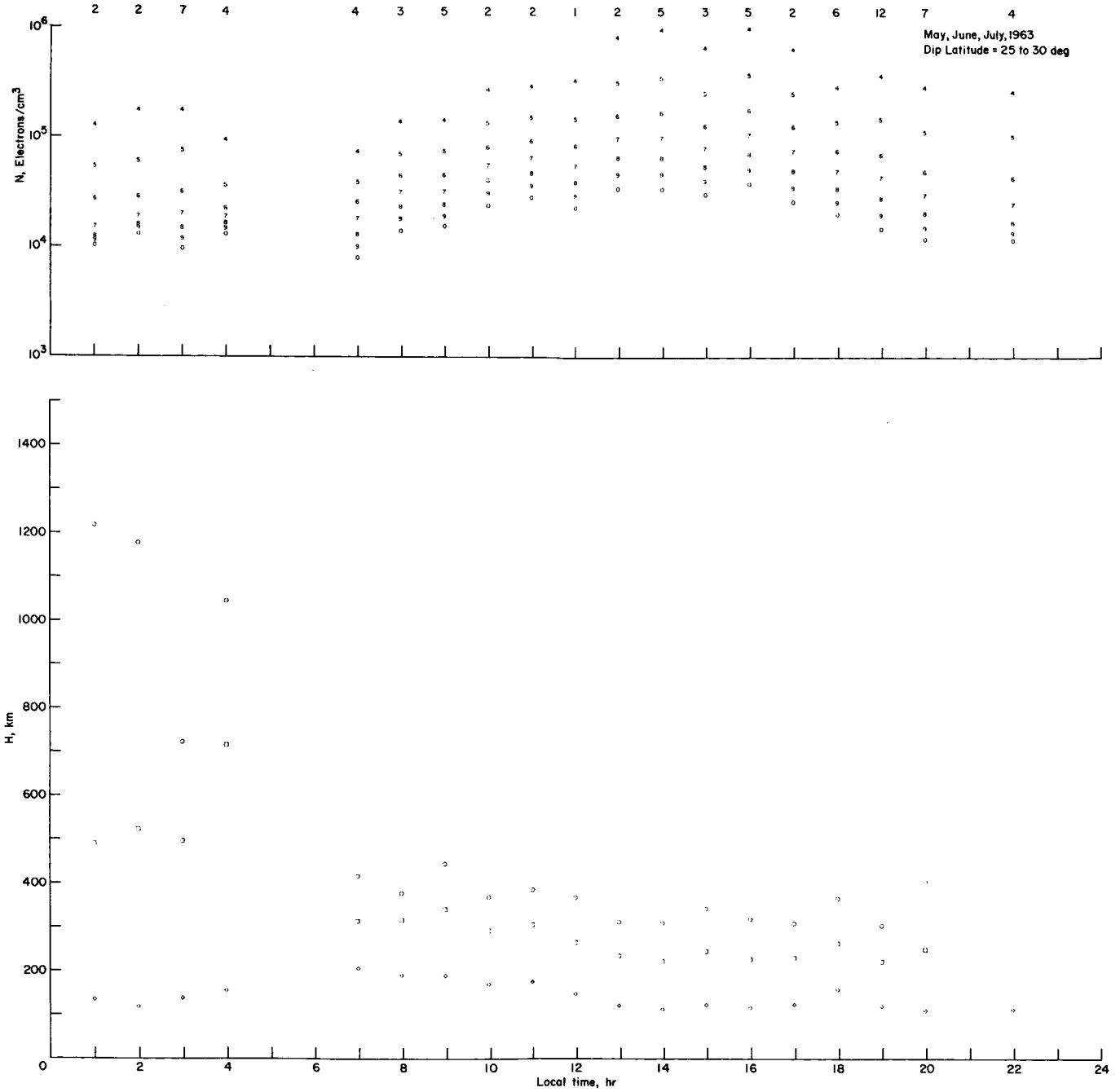

2 2 7 4 4 3 5 2 2 1 2 5 3 5 2 6 12 7 4
May, June, July, 1963
Dip Latitude = 25 to 30 deg
N, Electrons/cm³
10⁶
10⁵
10⁴
10³
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 288

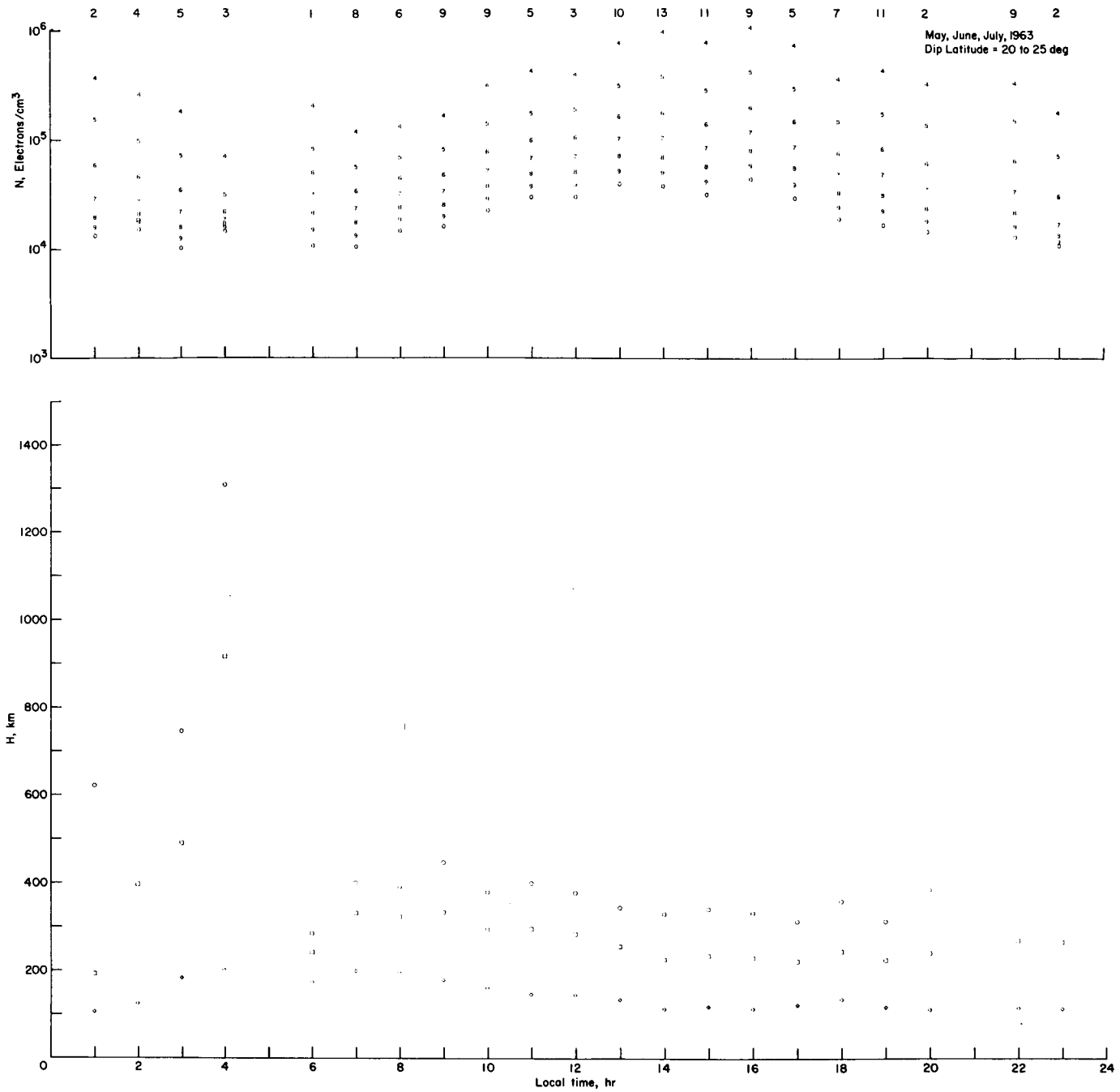

2 4 5 3 1 8 6 9 9 5 3 10 13 11 9 5 7 11 2 9 2
May, June, July, 1963
Dip Latitude = 20 to 25 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 289

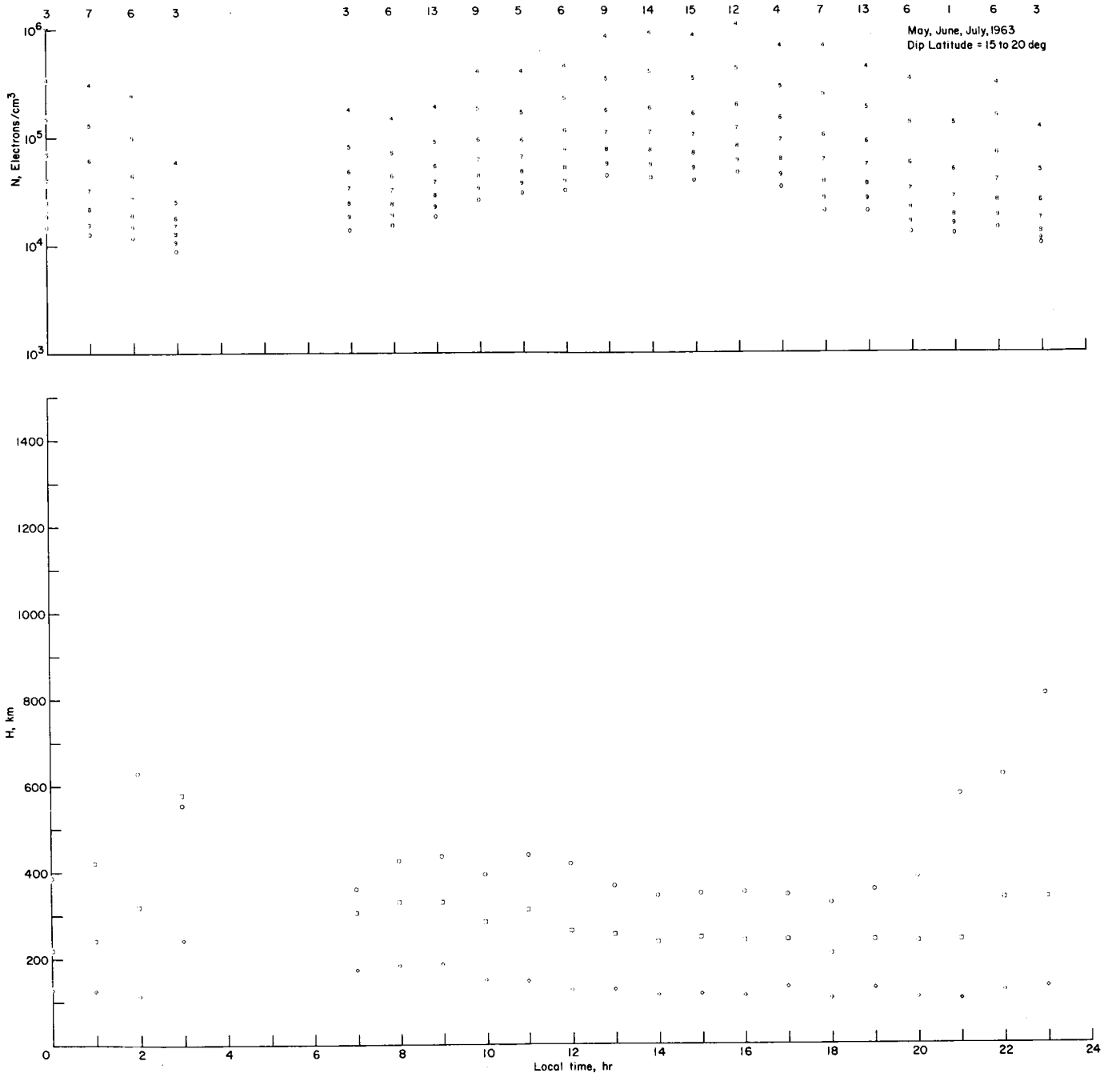

May, June, July, 1963
Dip Latitude = 15 to 20 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 290

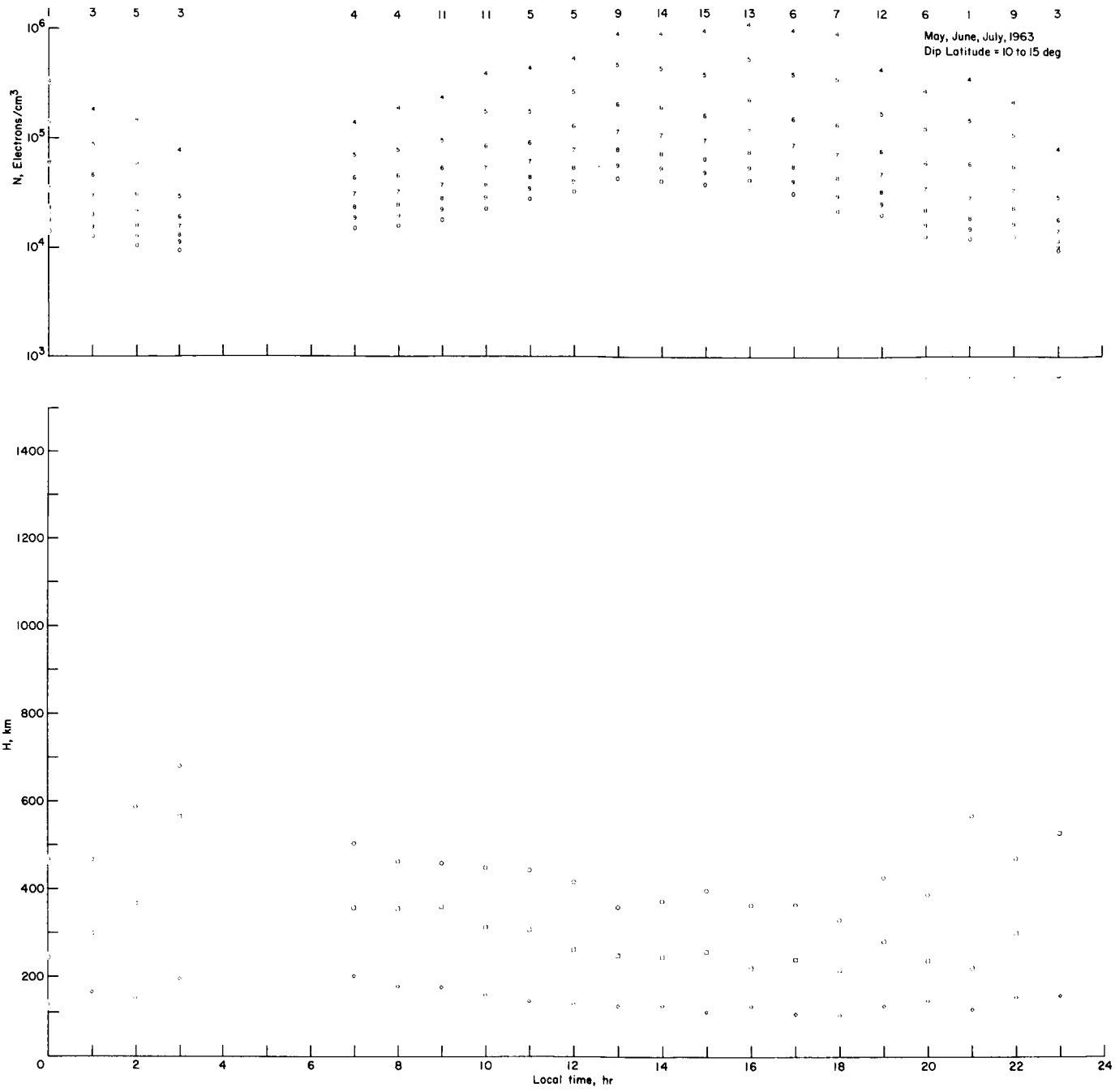

May, June, July, 1963
Dip Latitude = 10 to 15 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 291

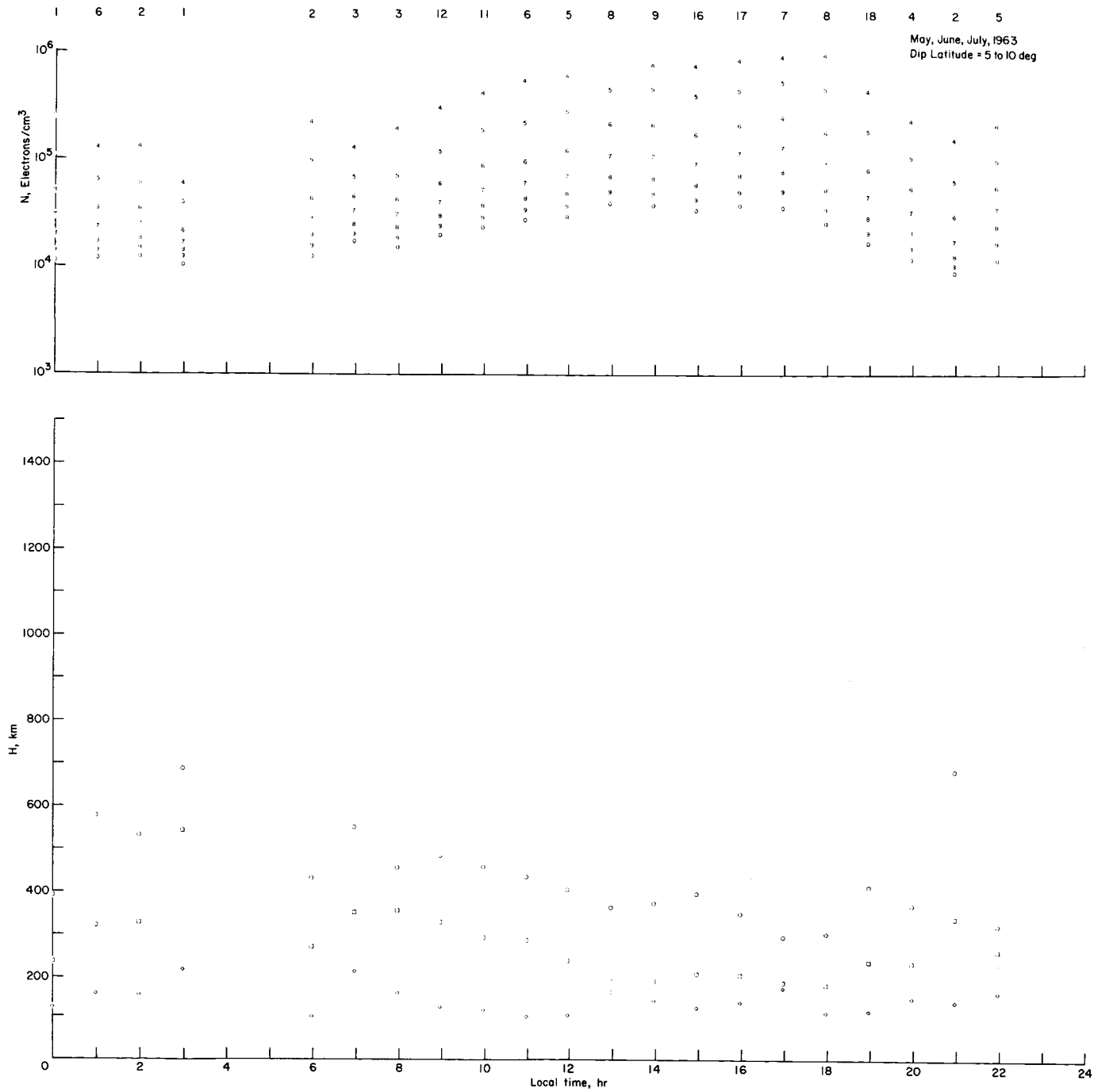

1 6 2 1 2 3 3 12 11 6 5 8 9 16 17 7 8 18 4 2 5
May, June, July, 1963
Dip Latitude = 5 to 10 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 292

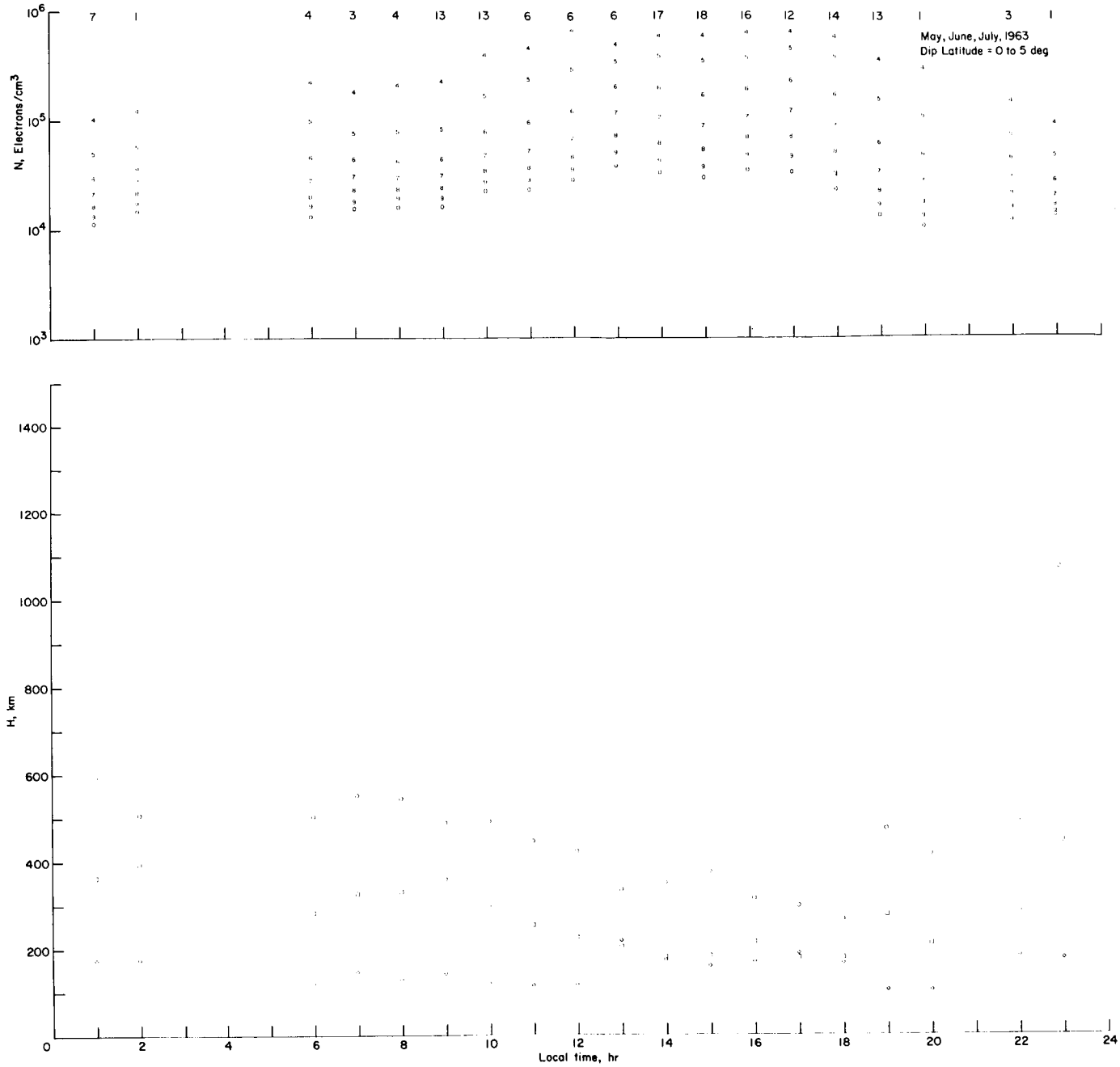

May, June, July, 1963
Dip Latitude = 0 to 5 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 293

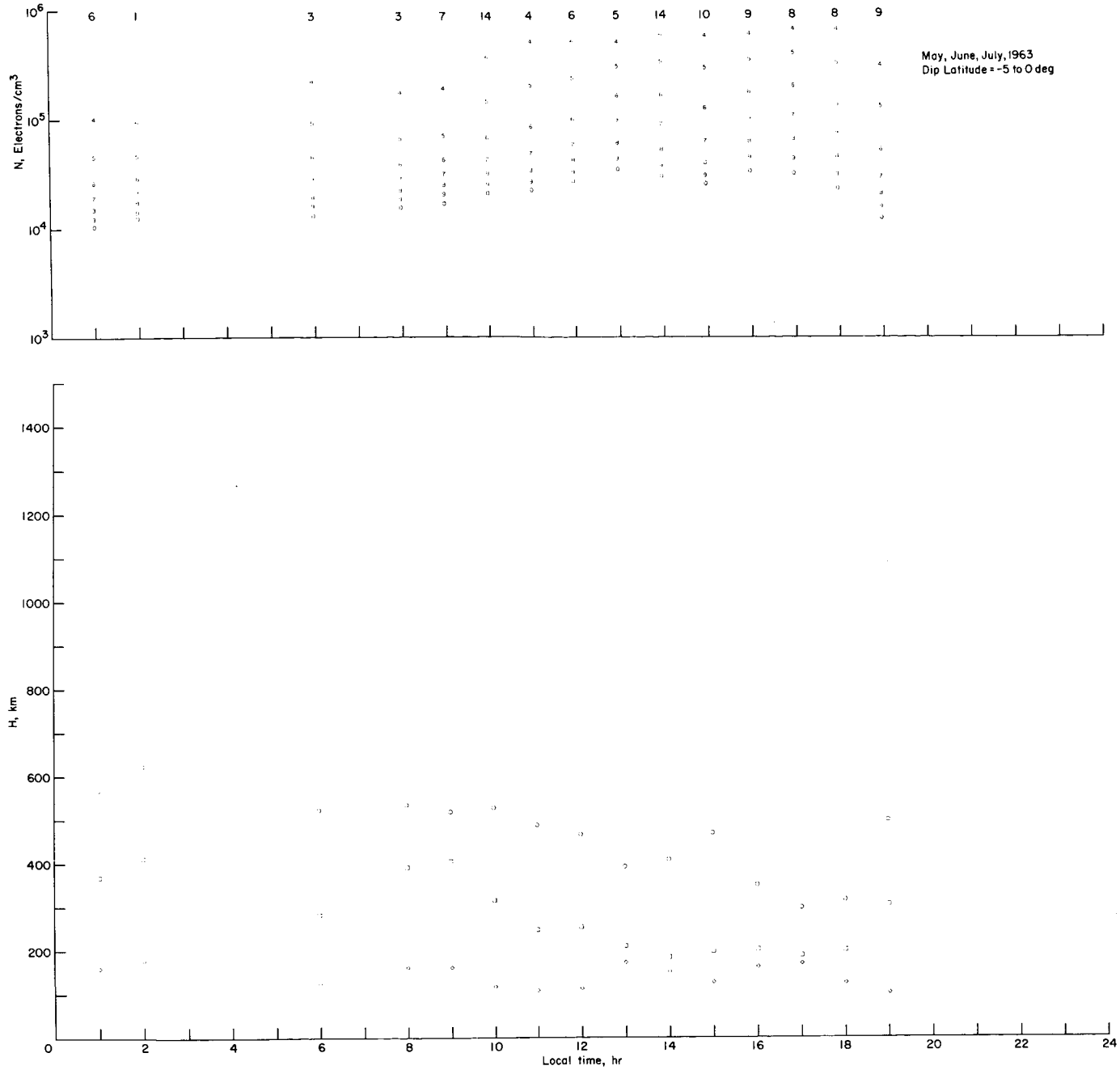

May, June, July, 1963
Dip Latitude = -5 to 0 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 294

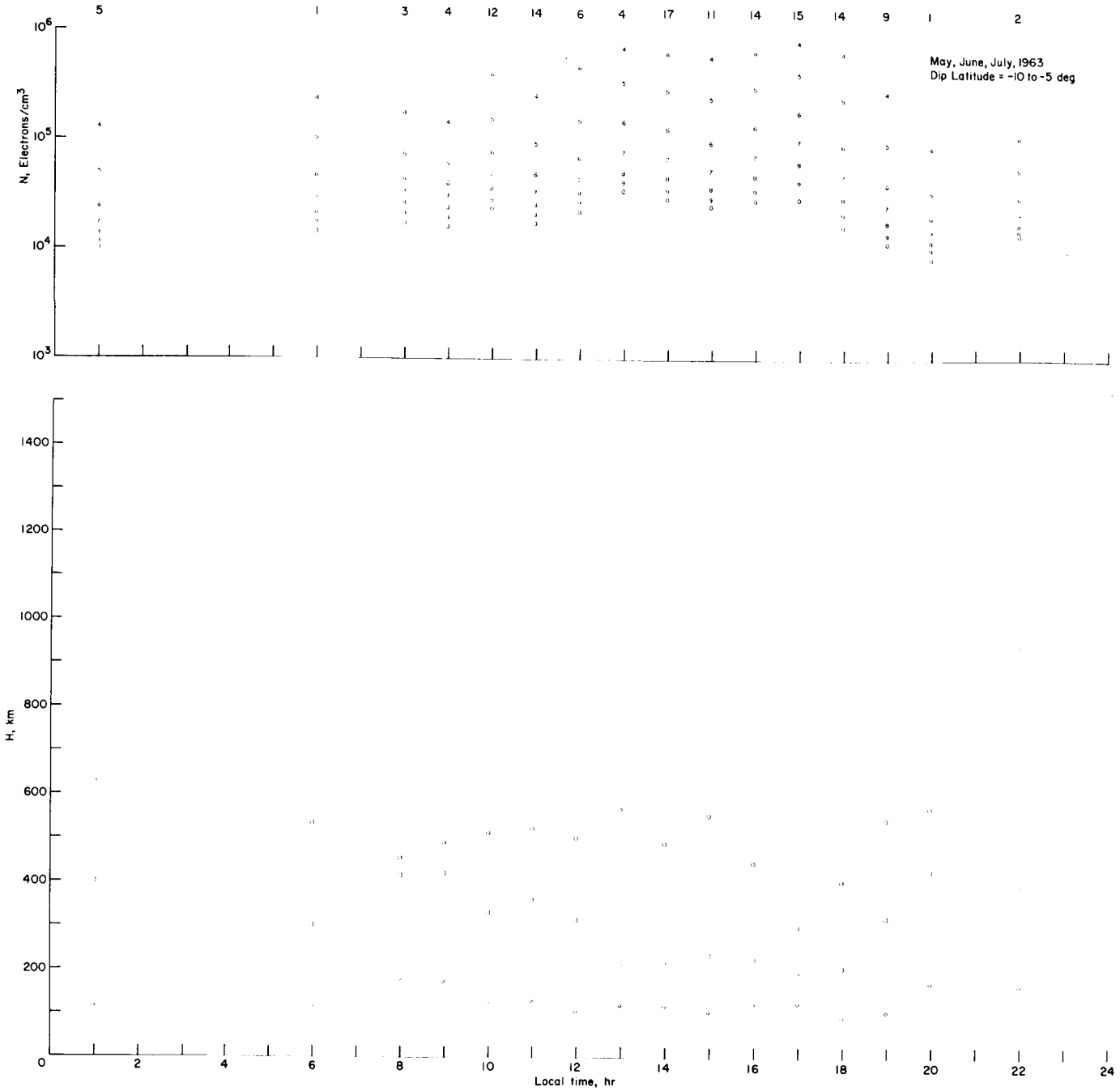

5 1 3 4 12 14 6 4 17 11 14 15 14 9 1 2
May, June, July, 1963
Dip Latitude = -10 to -5 deg
N, Electrons/cm3
10^6
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 295

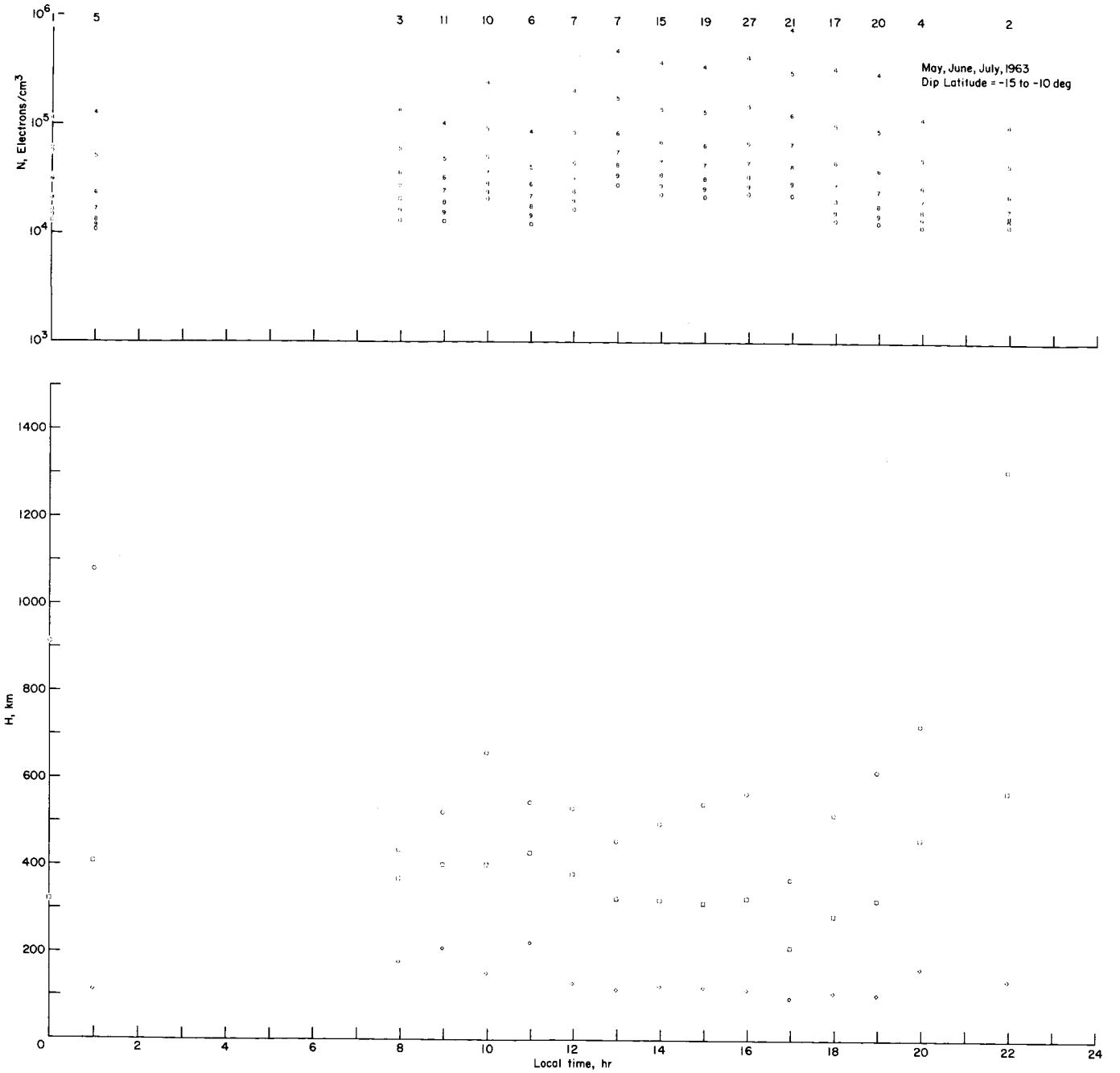

N, Electrons/cm³
10^6
10^5
10^4
10^3
5
3
11
10
6
7
7
15
19
27
21
17
20
4
2
May, June, July, 1963
Dip Latitude = -15 to -10 deg
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 296

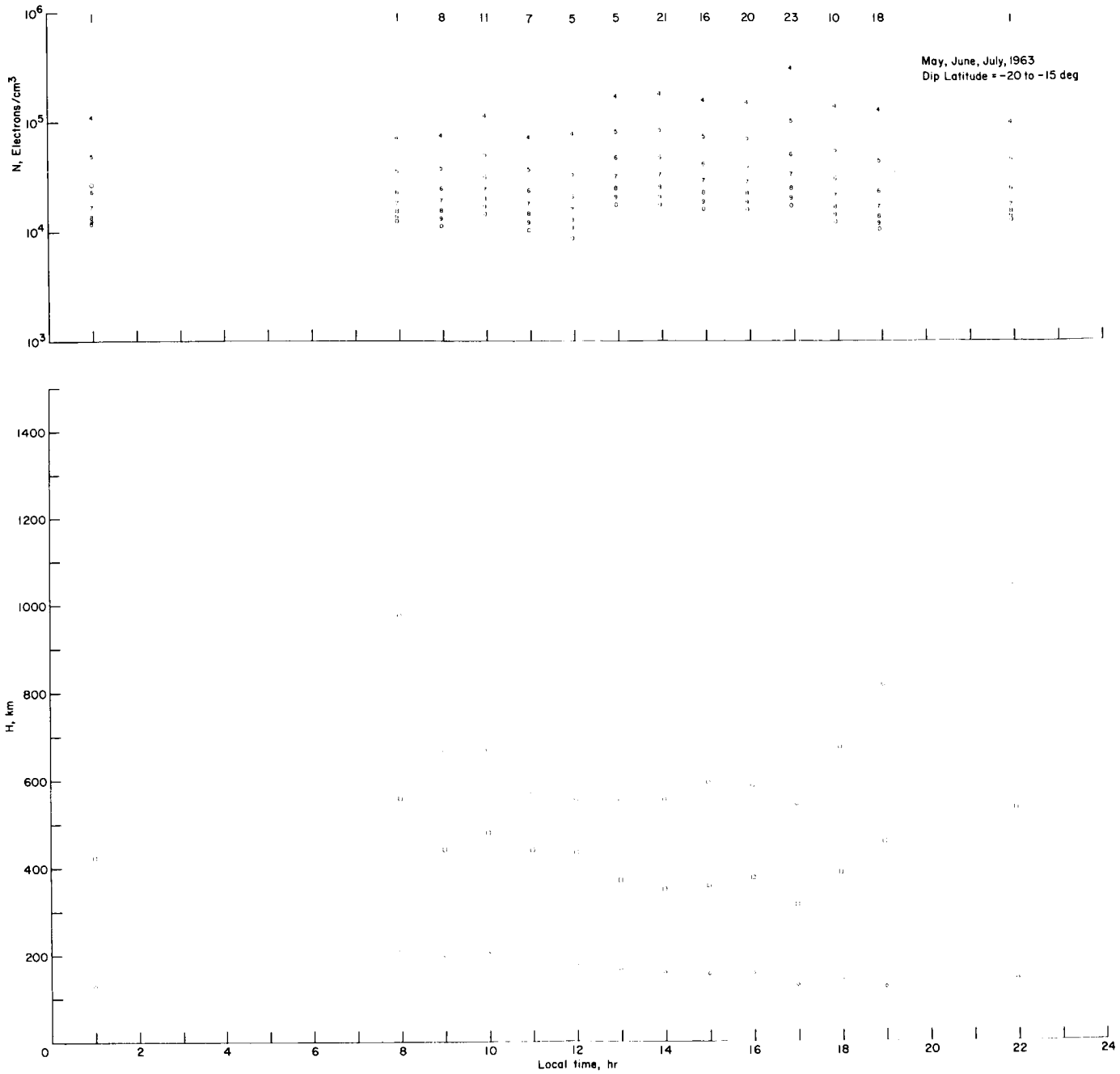

May, June, July, 1963
Dip Latitude = −20 to −15 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 297

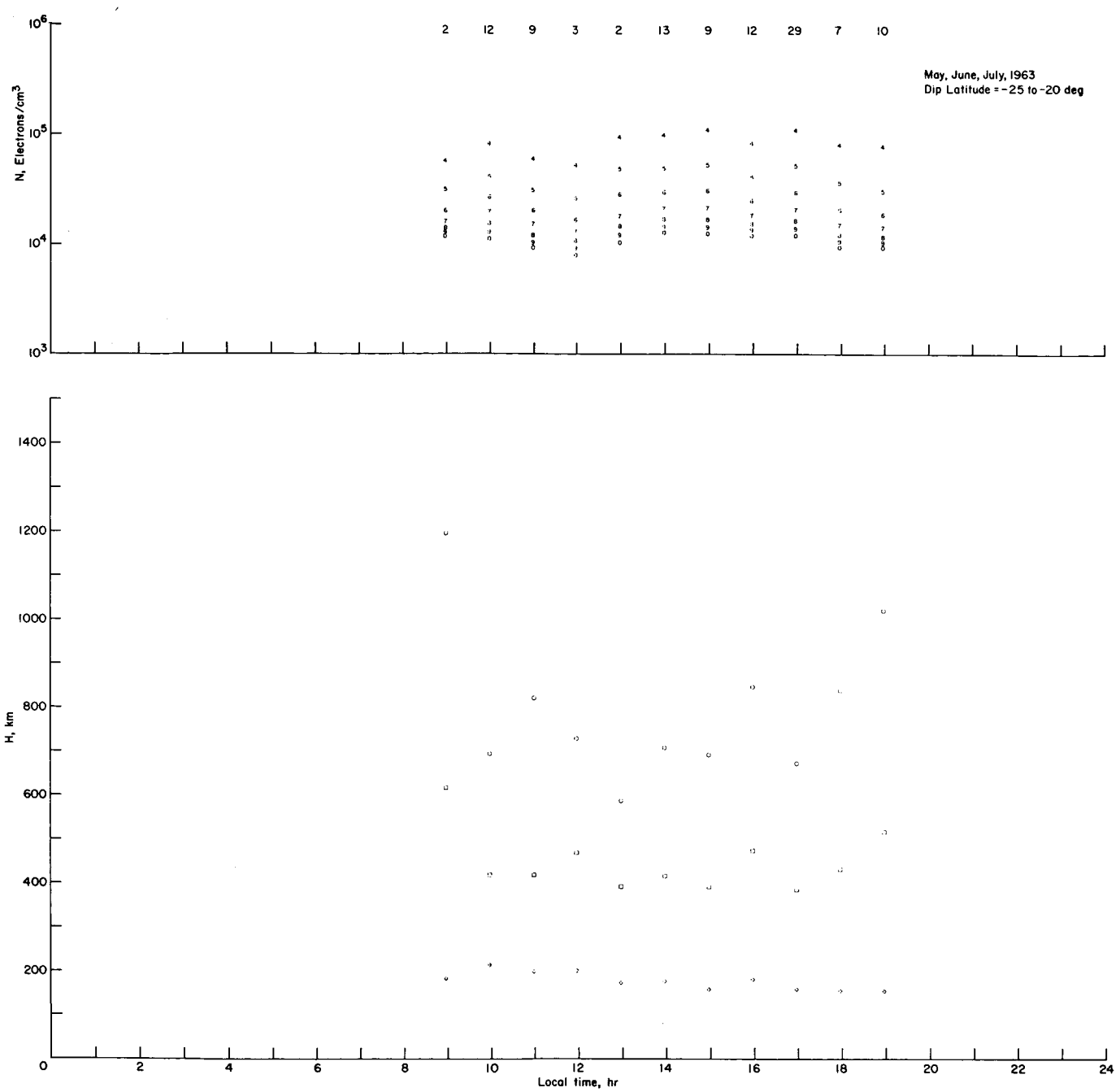

2 12 9 3 2 13 9 12 29 7 10
May, June, July, 1963
Dip Latitude = -25 to -20 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 298

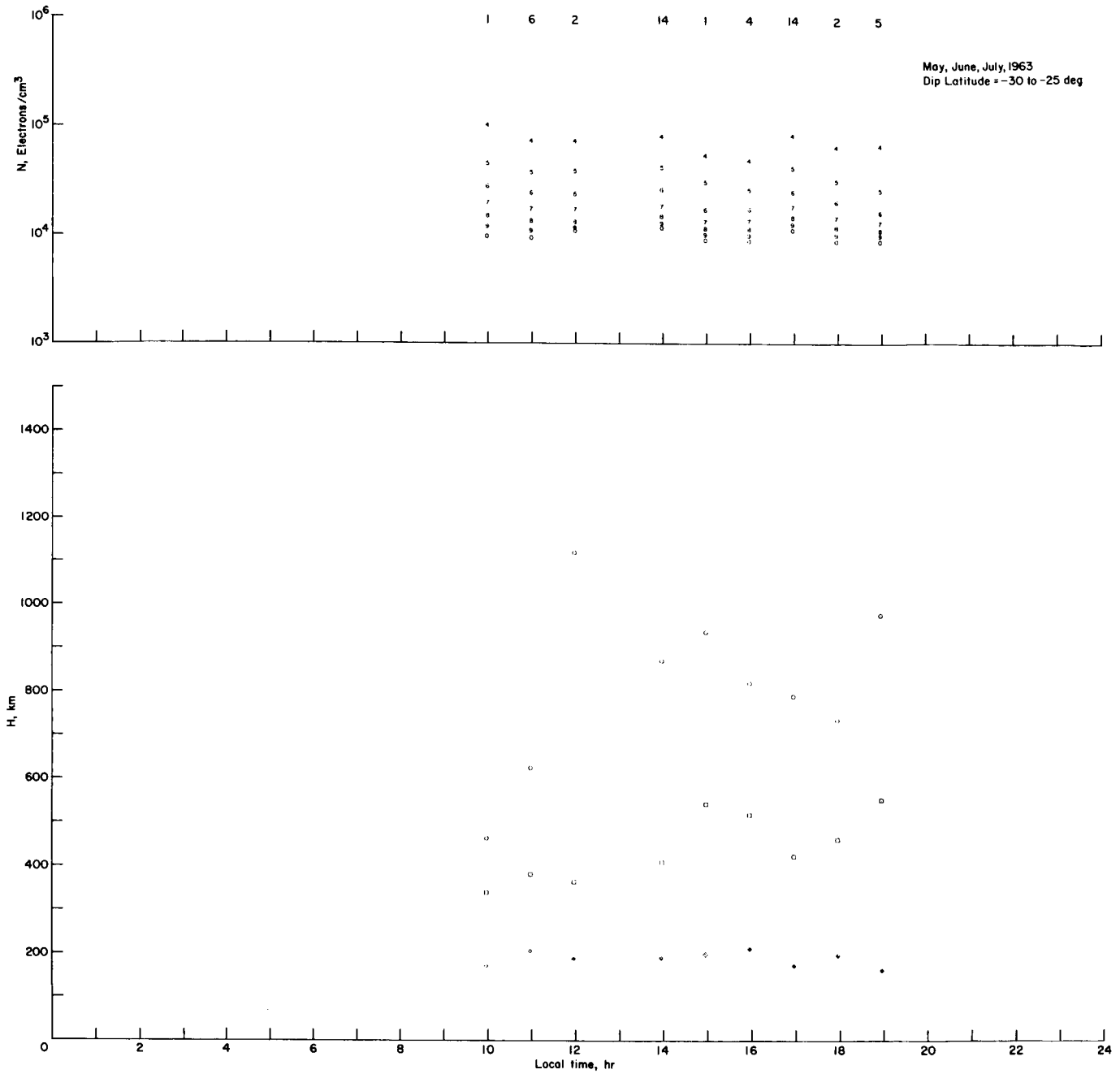

May, June, July, 1963
Dip Latitude = −30 to −25 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 299

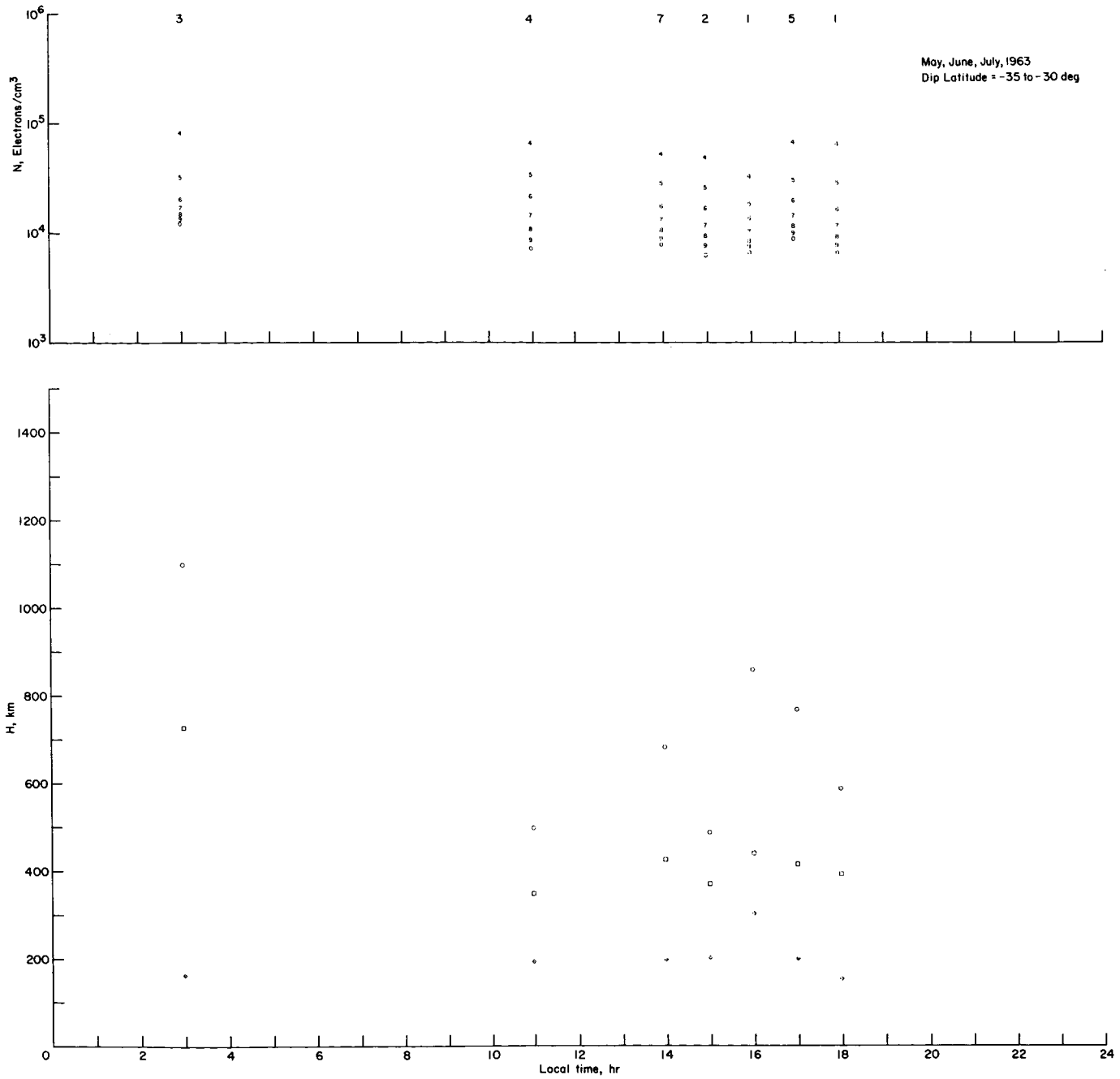

May, June, July, 1963
Dip Latitude = -35 to -30 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 300

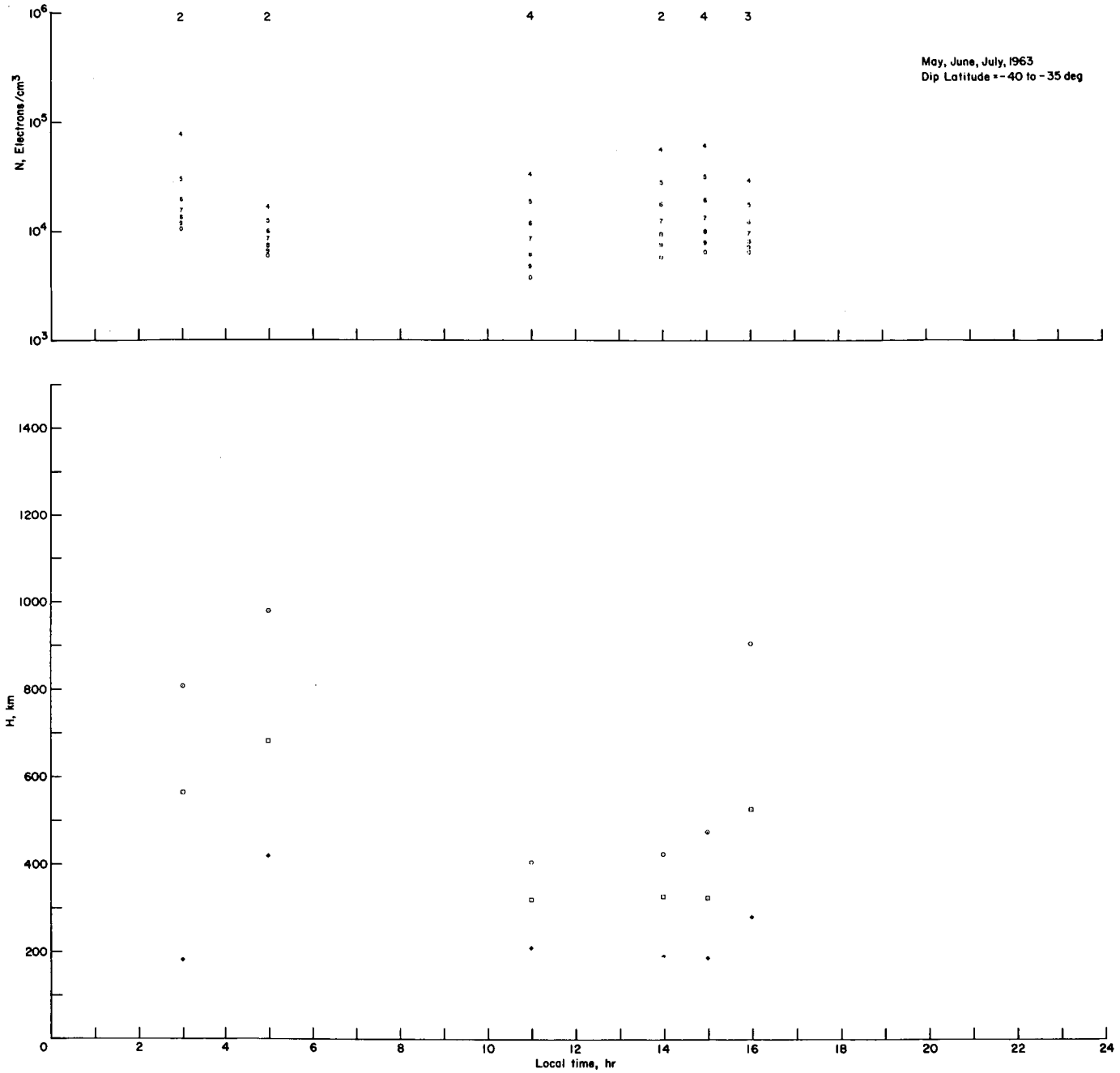

May, June, July, 1963
Dip Latitude = -40 to -35 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 301

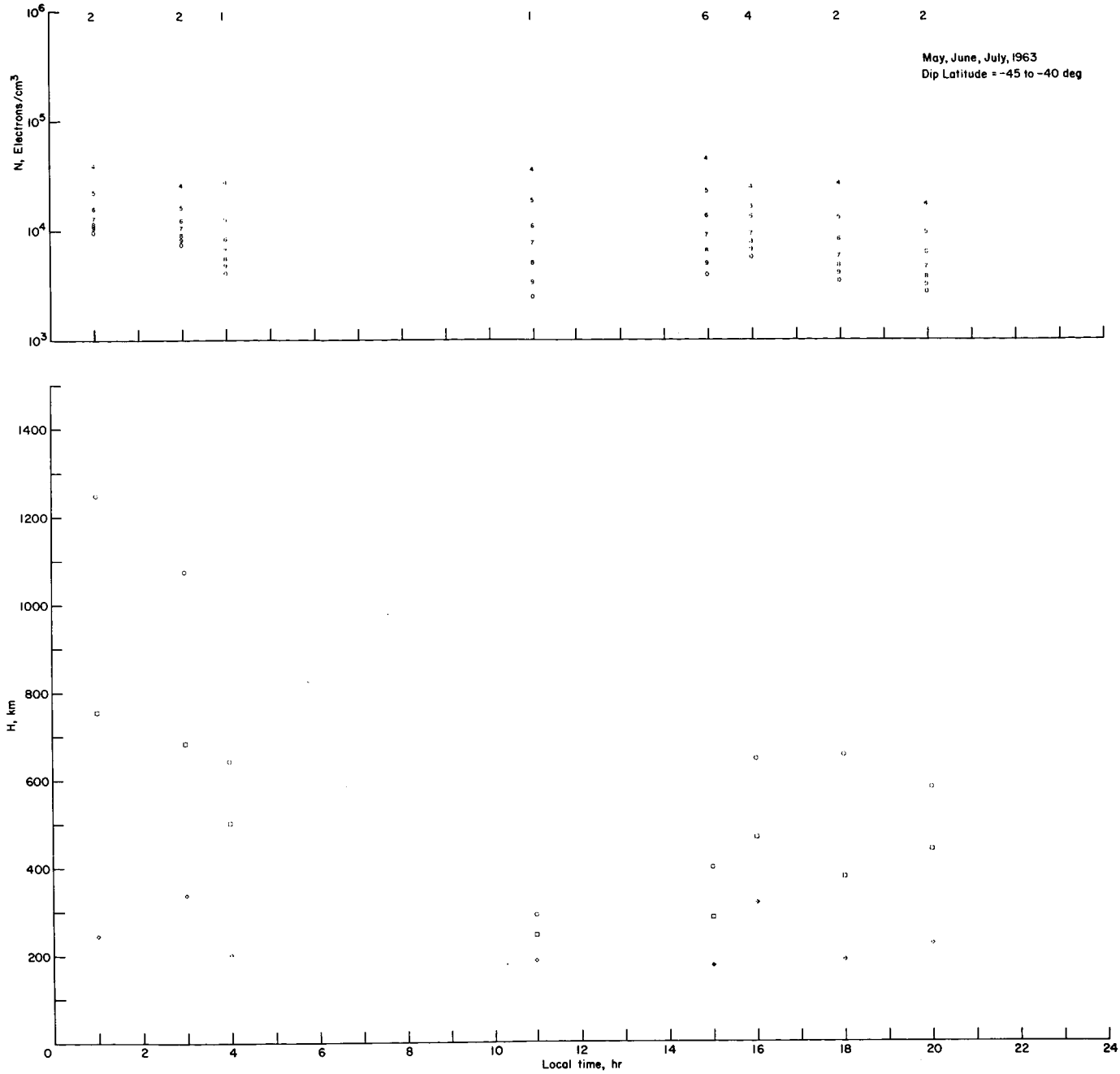

May, June, July, 1963
Dip Latitude = -45 to -40 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 302

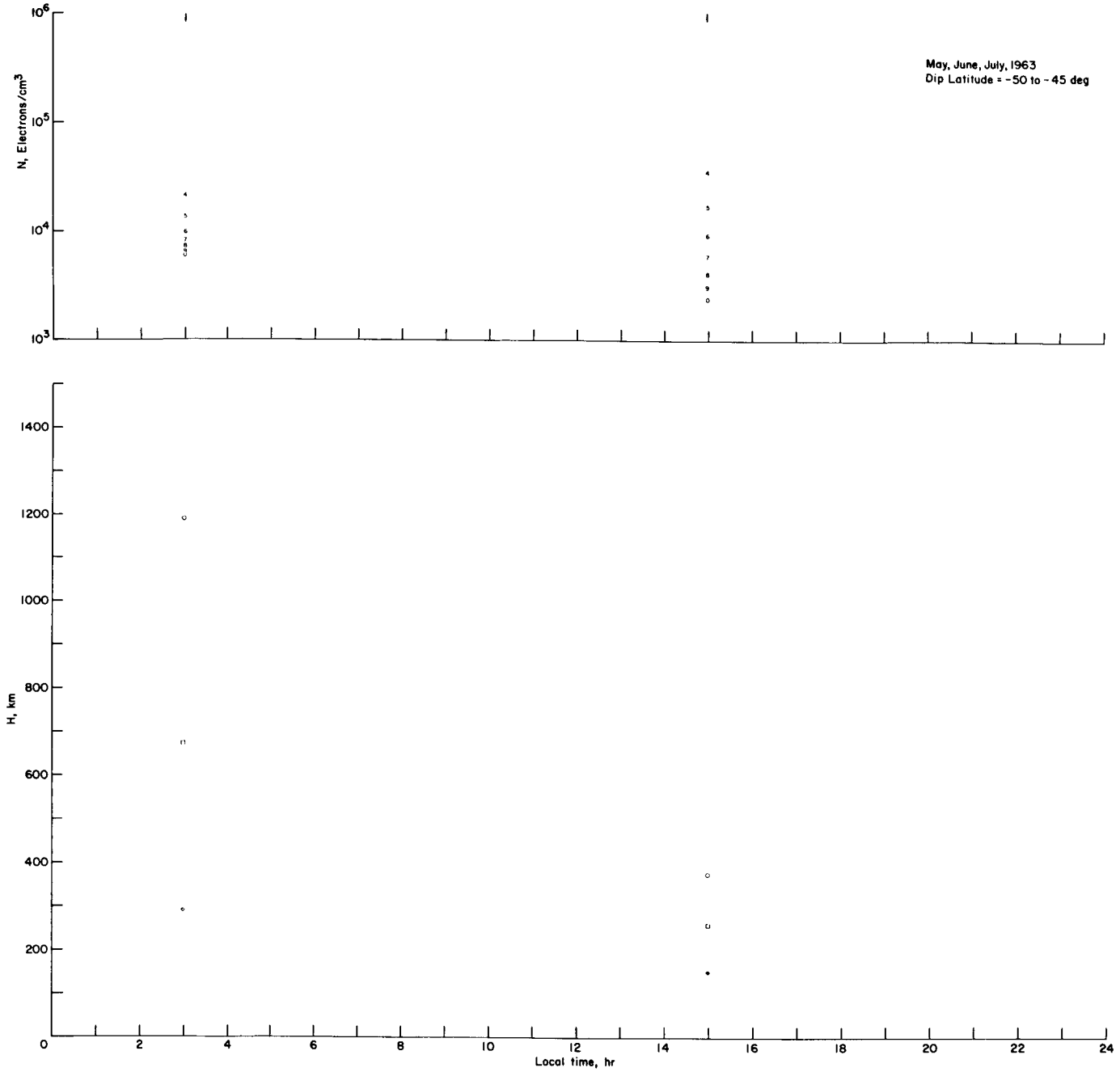

May, June, July, 1963
Dip Latitude = -50 to -45 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 303

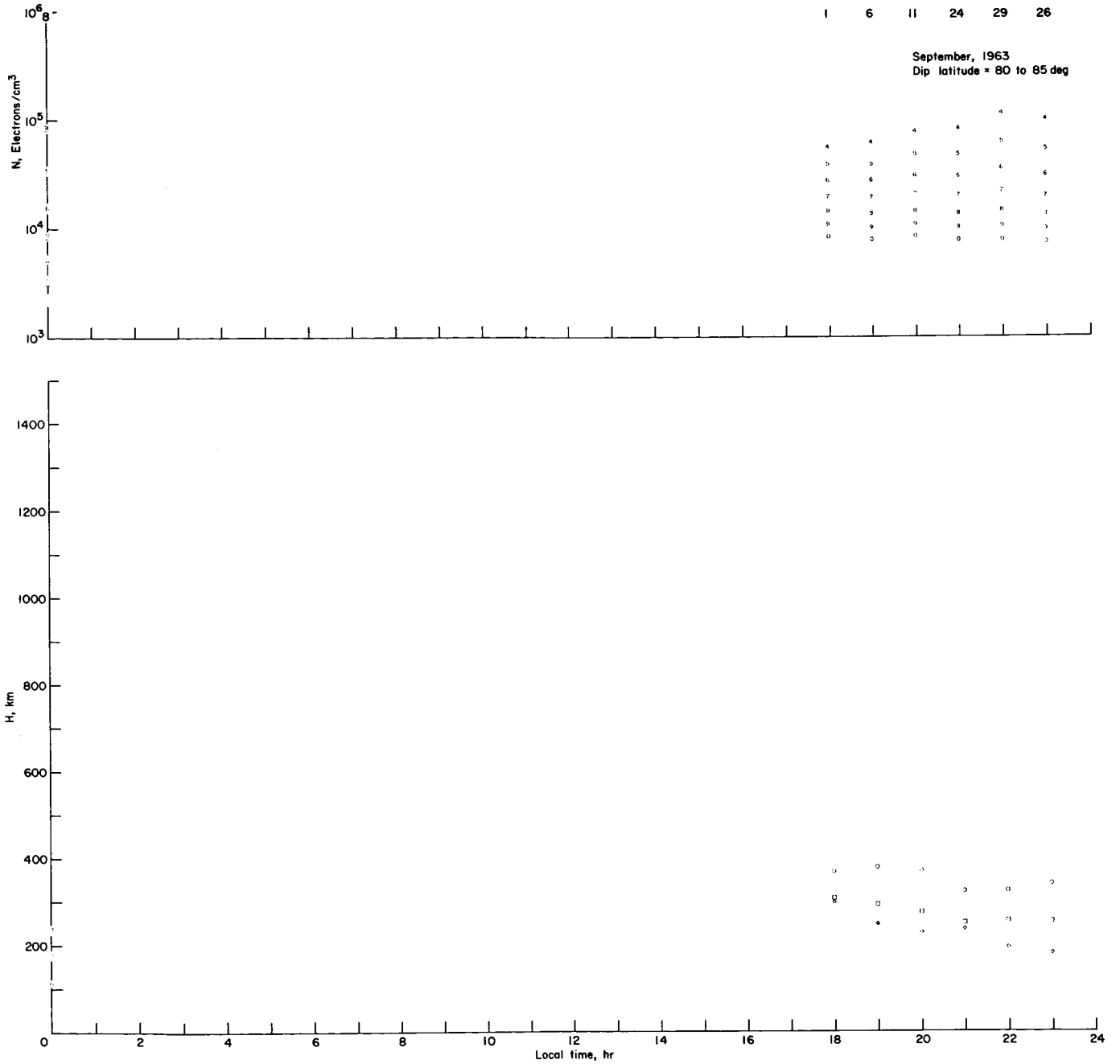

1 6 11 24 29 26
September, 1963
Dip latitude = 80 to 85 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 304

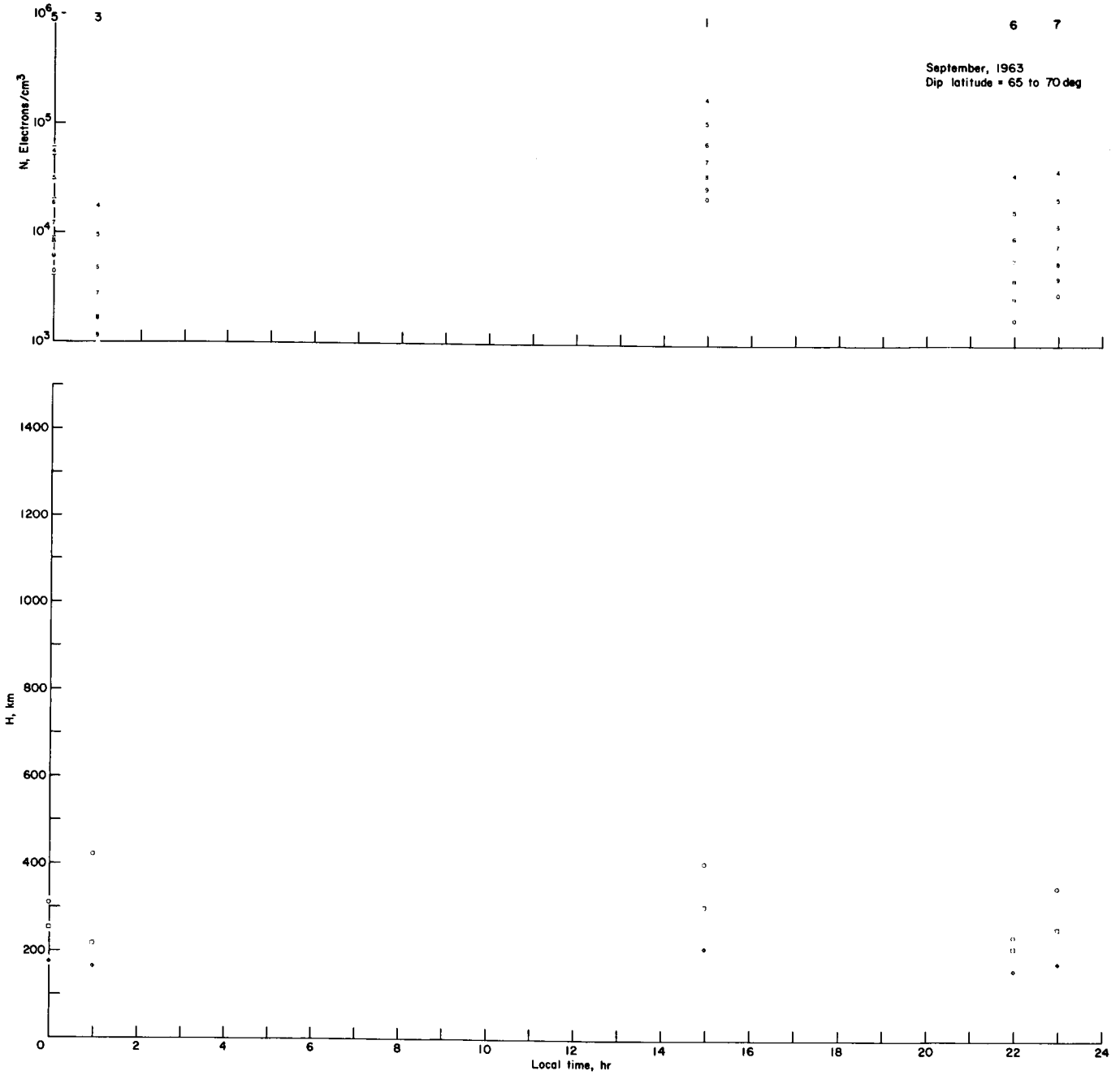

September, 1963
Dip latitude = 65 to 70 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 305

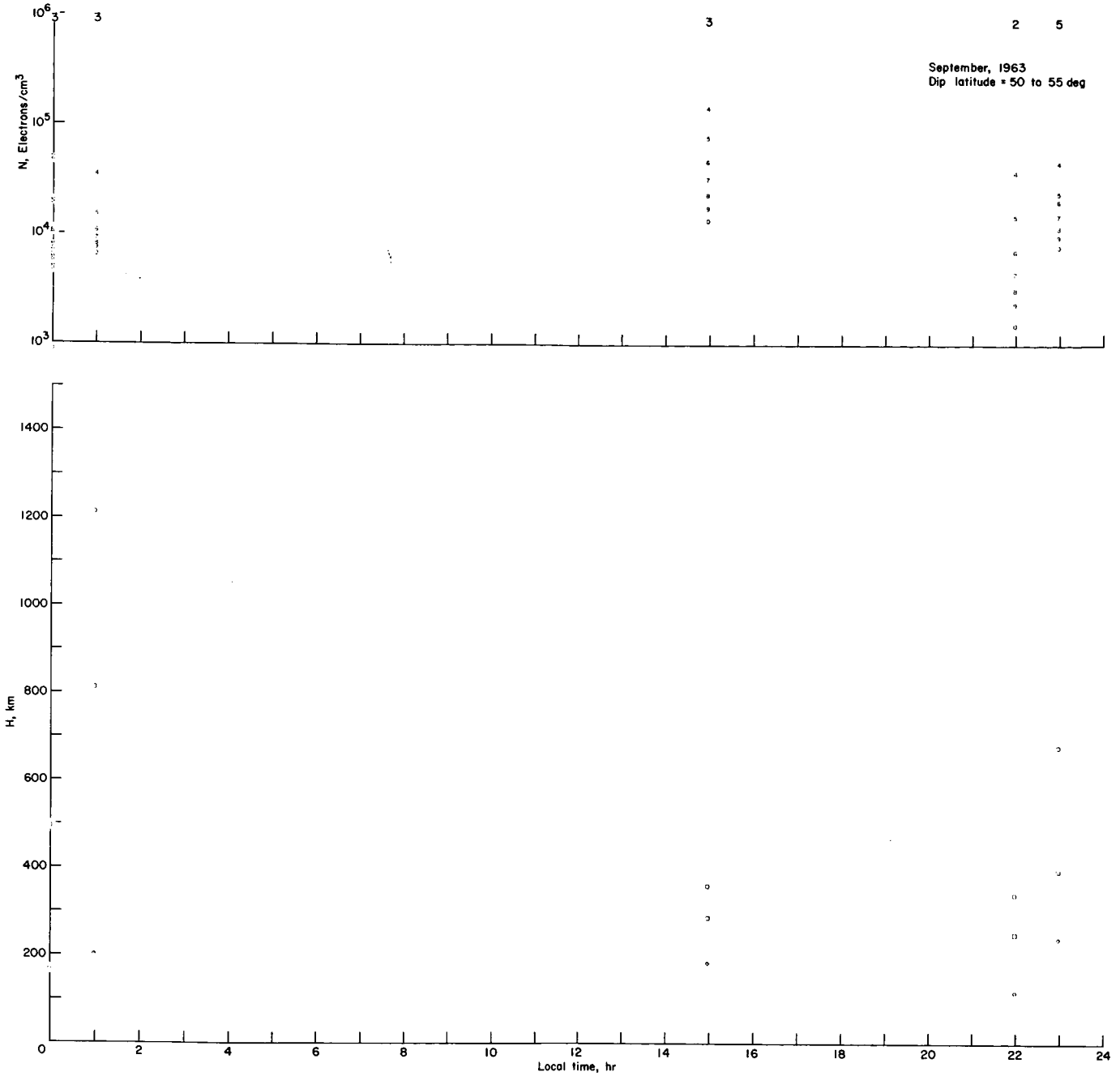

September, 1963
Dip latitude = 50 to 55 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 306

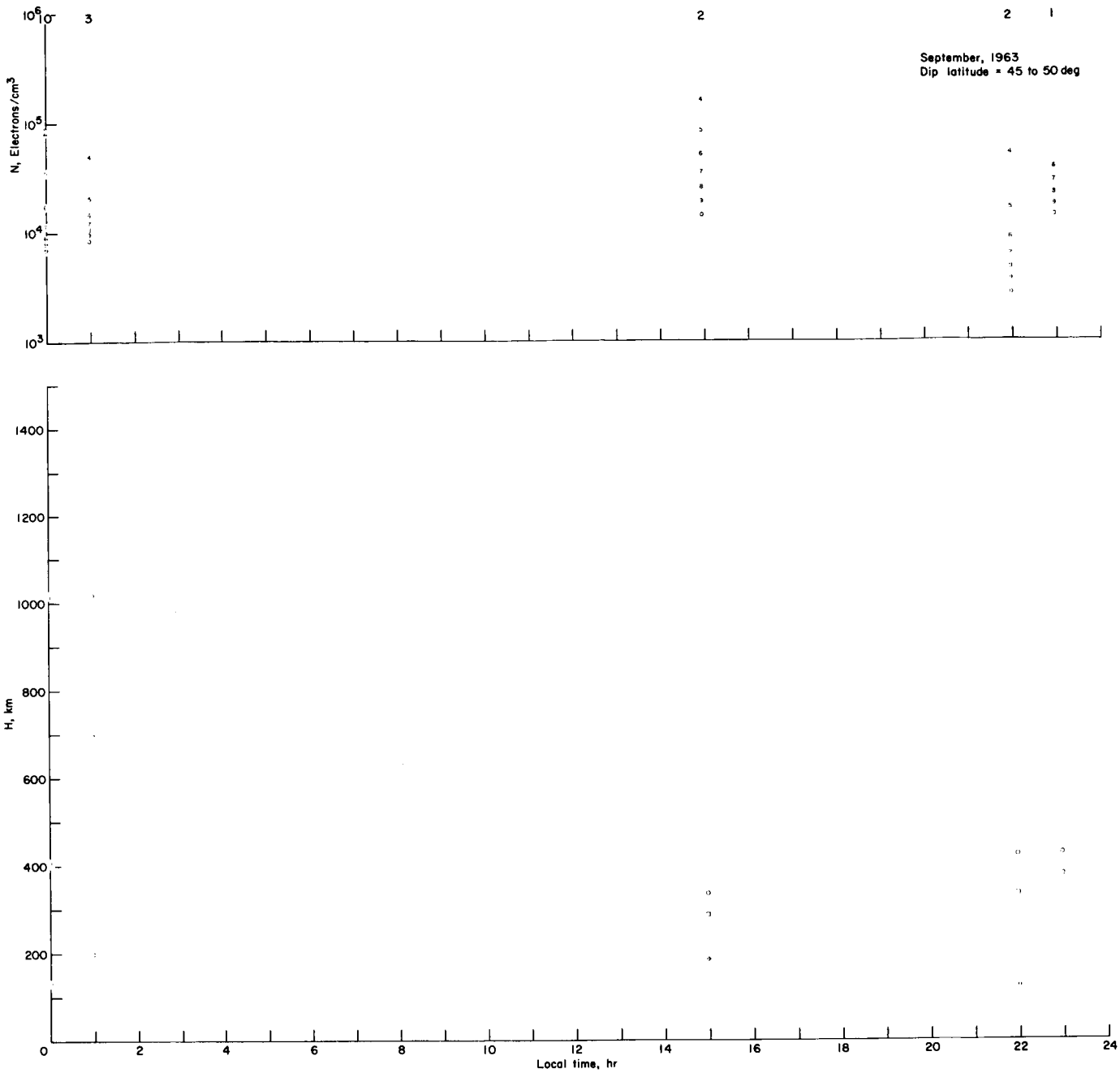

September, 1963
Dip latitude = 45 to 50 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 307

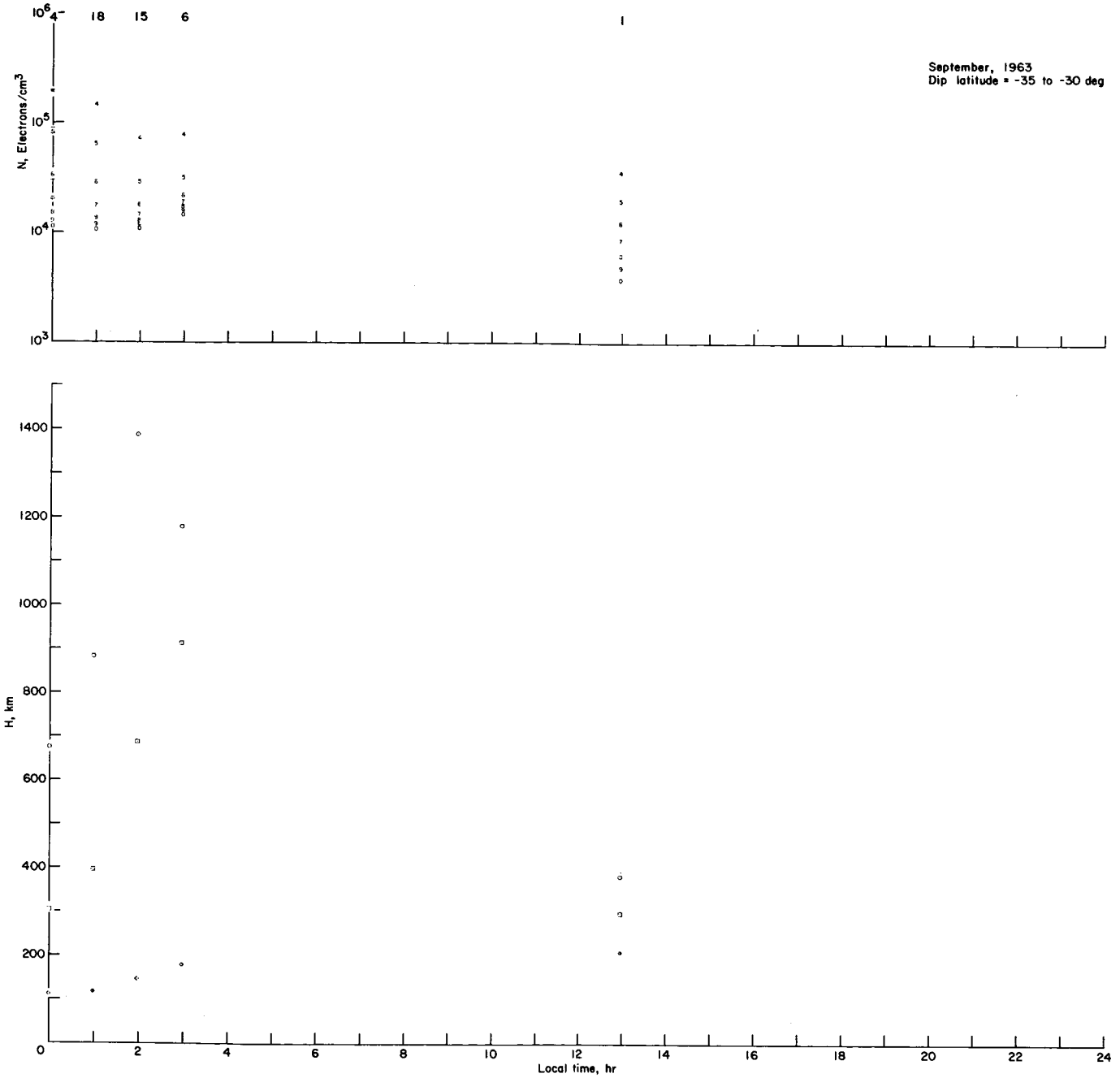

September, 1963
Dip latitude = -35 to -30 deg
N, Electrons/cm³
H, km
Local time, hr

Figure 308

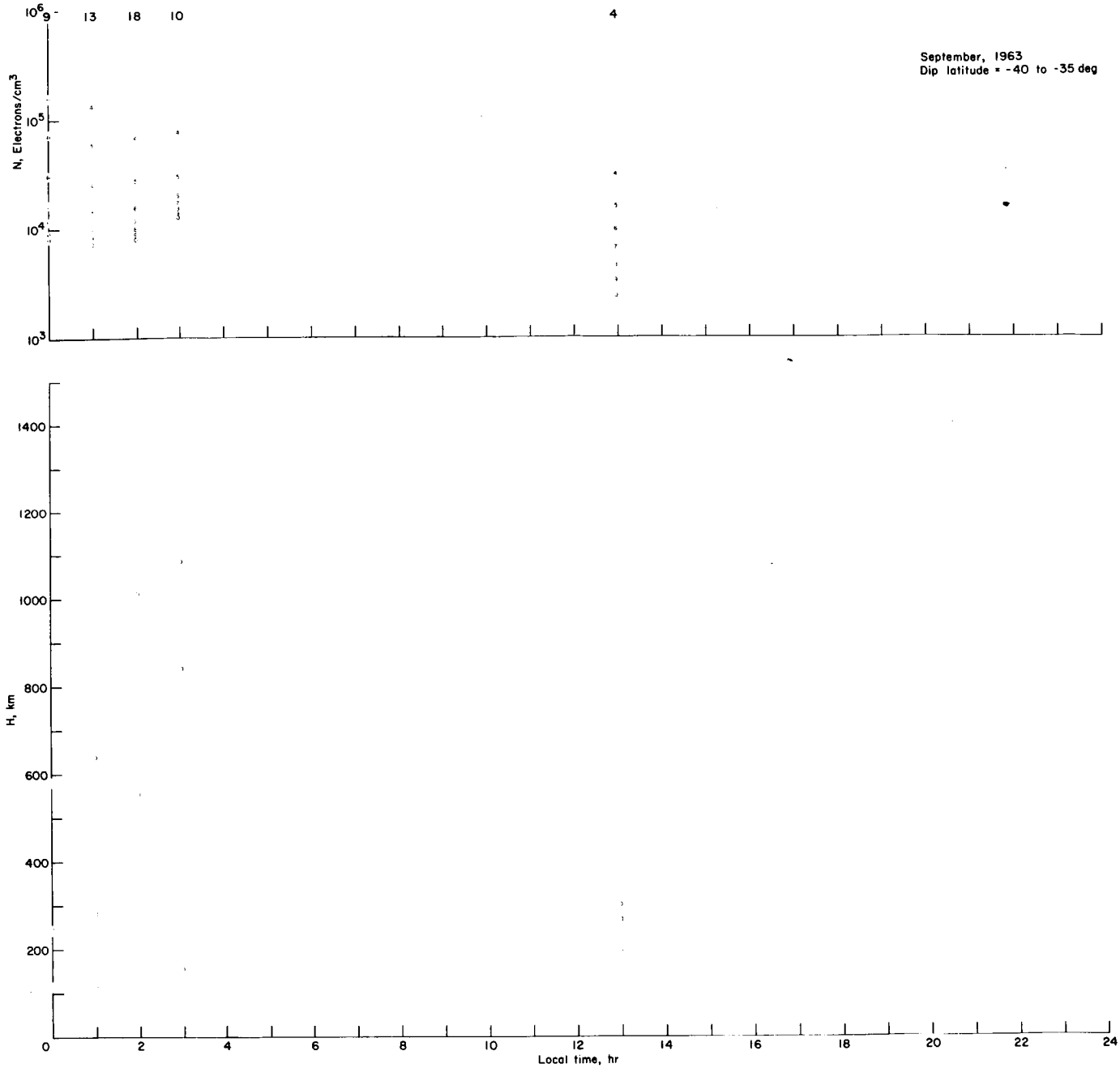

13
18
10
4
September, 1963
Dip latitude = -40 to -35 deg
N, Electrons/cm3
10^6
9
10^5
10^4
10^3
H, km
1400
1200
1000
800
600
400
200
0
2
4
6
8
10
12
14
16
18
20
22
24
Local time, hr

Figure 309

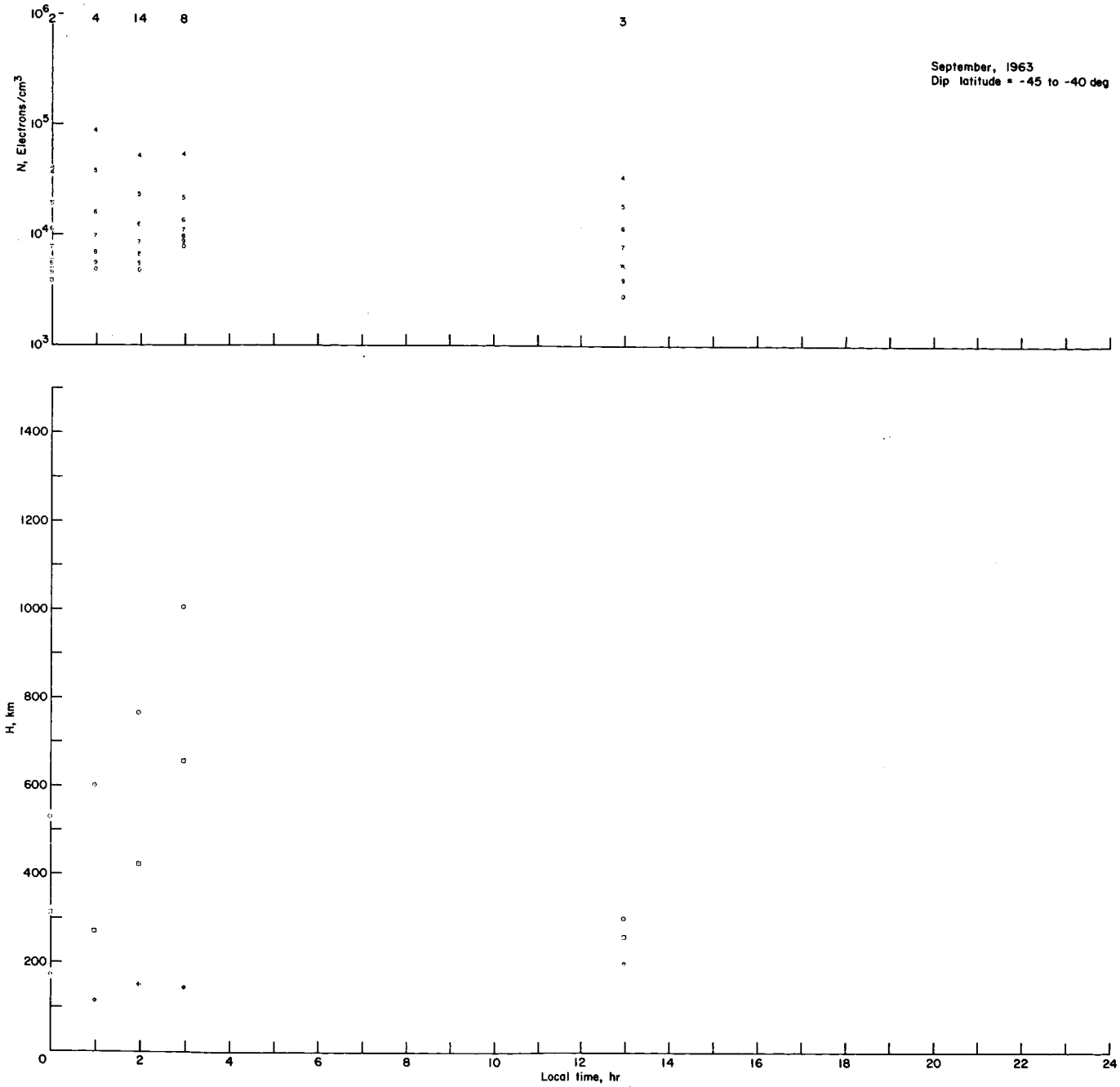

September, 1963
Dip latitude = -45 to -40 deg
N, Electrons/cm3
H, km
Local time, hr

Figure 310

"The aeronautical and space activities of the United States shall be conducted so as to contribute . . . to the expansion of human knowledge of phenomena in the atmosphere and space. The Administration shall provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof."

—NATIONAL AERONAUTICS AND SPACE ACT OF 1958

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